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Vol. 958 Number 5

OFFICIAL GAZETTE

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PATENTS

May 31, 1977

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Patent and Trademark Office

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OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

May 31, 1977 Volume 958 Number 5

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PATENT AND TRADEMARK OFFICE NOTICES

Board of Appeals Decisions Rendered in the Month of April 1977

Affirmed	218
Affirmed in part	34
Reversed	66
Total	318

Examination

Pursuant to the provisions of 37 C.F.R. 1.341(c), an examination for persons seeking registration before the United States Patent and Trademark Office as patent attorneys or agents will be held on Tuesday, September 6, 1977.

With the exception of those former patent examiners for whom the examination is waived, all persons recognized for practice before the Patent and Trademark Office in patent cases must, pursuant to the noted rule, pass the examination. Those passing the examination do not thereby qualify for recognition for practice before the Patent and Trademark Office in trademark cases. Recognition for practice in trademark cases is governed by Rule 2.12 of the Trademark Rules of Practice, which does not require the passing of an examination.

The examintaion will be given under the supervision of the Civil Service Commission, and may be taken in any of the cities in which the Civil Service Commission regularly conducts examinations. Applications to take the examination must be filed in the Patent and Trademark Office together with a $35 fee not later than July 31, 1977.

Application blanks may be obtained from the Clerk of the Patent and Trademark Office Committee on Enrollment, Bldg. 3, 11th Floor, Room C16, Crystal Plaza, Arlington, Va., or by mail addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231, and directed to the attention of the Clerk of the Committee on Enrollment.

LUTRELLE F. PARKER,
May 9, 1977. *Chairman, Committee on Enrollment.*

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

3,256,015, W. E. Perrin, EXERCISING APPARATUS, **filed** Dec. 20, 1976, D.C., W.D. Wis. (Madison) Doc. 76–C–644, *William E. Perrin and Health & Sports Specialties, Inc.* v. *Robert S. Hinds and Lifeline Production & Marketing, Inc.*

3,370,302, A. A. Karlyn, PROTECTIVE SHIELD ASSEMBLY; **3,476,107,** Matt and Steinert, IMMOBILIZATION SHIELD, **filed** Dec. 30, 1976, D.C., S.D. Ohio (Cincinnati) Doc. C–1–76–596, *Jamco Inc.* v. *Premier Seat & Accessory.*

3,393,824, A. I. Appleton, NONJAMMING HOUSING AND COVER ASSEMBLY, **filed** Dec. 21, 1976, D.C., N.D. Ill. (Chicago) Doc. 76c4627, *Arthur I. Appleton and Appleton Electric Company* v. *Crouse-Hinds Company.*

3,437,669, J. King, PROCESS FOR PRODUCING AN ODOROUS ISOMER OF DIISOPROPYL DIHYDROCOUMARIN, **filed** Dec. 20, 1974, D.C., N.D. Ill. (Chicago) Doc. 74c3702, *Velsicol Chemical Corporation* v. *Monsanto Company.* Enter decision on appeal from decision of Board of Patent Interferences dated Oct. 24, 1974, that find and conclude that defendant is entitled to judgment affirming the decision of the Board of Patent Interferences, Nov. 1, 1976.

3,452,895, K. U. Kalkowski, UTENSIL FOR PREVENTING SPRAYING WITH FRYING PANS, COOKING POTS OR THE LIKE, **filed** Mar. 25, 1971, D.C., N.D. Ill. (Chicago) Doc. 71c743, *Kurt Ulrich Kalkowski* v. *Ronco, Inc.* Judgment, said patent and claims 1 and 2 are invalid; complaint herein is dismissed. Defendant is entitled to judgment on its declaratory judgment counterclaim of invalidity and noninfringement. Defendant's counterclaim for unfair competition and counterclaim are hereby dismissed, Dec. 22, 1976.

3,476,107. (See 3,370,302.)

3,477,428, G. F. Hare, COMBINED SPLINT AND TRACTION DEVICE, **filed** Dec. 20, 1976, D.C., N.D. Ind. (South Bend) Doc. S76–221, *Dyna Med, Inc.* v. *Orthopedic Equipment Company.*

3,491,590, B. K. Watkins, POWER STOPPER WEIGHT TRANSFER APPARATUS; **3,633,413,** R. P. Case, DEVICE FOR MEASURING PULLING POWER, **filed** Dec. 30, 1976, D.C., N.D. Ill. (Chicago) Doc. 76c4810, *National Tractor Pullers Association, Inc.* v. *Billy K. Watkins.*

3,551,744, A. L. Keller, FLASHER CONTROL CIRCUIT; **3,639,777,** J. F. Bolinger, FLASHER CIRCUIT; **3,716,682,** W. O. Wizemann, TURN SIGNAL SWITCH, **filed** Sept. 16, 1976, D.C., N.D. Ind. (South Bend), Doc. S76–162, *Nartron Corporation* v. *AM General Corporation et al.*

3,633,413. (See 3,491,590.)

3,639,777. (See 3,551,744.)

3,646,748, F. A. Lang, TENDONS FOR PRESTRESSED CONCRETE AND PROCESS FOR MAKING SUCH TENDONS, **filed** Mar. 8, 1976, D.C., E.D. Pa. (Philadelphia) Doc. 76–706, *William F. Kelly* v. *Frederic A. Lang.* The complaint and counterclaim of plaintiff are hereby dismissed with prejudice, Oct. 26, 1976.

3,650,766, Y. Smadar, EXTRUDED FOOD PRODUCTS AND METHOD OF PRODUCING SAME, **filed** Oct. 14, 1976, D.C., N.D. Ohio (Cleveland) Doc. C76–521, *DCA Foods Industries Inc.* v. *Fry Foods, Inc.* Cause dismissed by plaintiff without prejudice, Dec. 28, 1976.

3,651,320, M. L. Lasker, LIGHTING FIXTURES, **filed** Dec. 29, 1976, D.C. Minn. (Minneapolis), Doc. 4–76–C 582, *Sterner Lighting Systems, Incorporated* v. *Wylain, Inc.*

3,669,298, Silver and Schmidt, MATERIAL HANDLING BOX, **filed** June 29, 1976, D.C. N.D. Ohio (Toledo) Doc. C76–321, *Triple E Corporation* v. *Sanchez Enterprises, Inc.* Stipulation and order dismissing case without prejudice, Dec. 30, 1976.

3,716,682. (See 3,551,744.)

3,785,050, Whitledge and Kavick, COUPLING ATTACHMENT DEVICE; **3,858,298,** same, SWAGING APPARATUS, **filed** Dec. 20, 1976, D.C., N.D. Ohio (Cleveland) Doc. C76–1332, *Parker-Hannifin Corporation* v. *Samuel Moore & Company.*

3,836,767, M. L. Lasker, LIGHTING FIXTURES, **filed** Dec. 22, 1976, D.C.N.J. (Newark) Doc. 76–2437, *Marvin Electric Manufacturing Company* v. *Wylain, Inc.*

3,858,298. (See 3,785,050.)

3,910,728, A. H. Sloan, DEWATERING PUMP APPARATUS; **3,957,402,** same, DEWATERING PUMP ASSEMBLY HAVING A HEAT EXCHANGER; **3,957,403,** same, DEWATERING PUMP ASSEMBLY, **filed** Dec. 17, 1976, D.C., S.D. Fla. (Miami) Doc. 76–2328–C–je, *Albert H. Sloan* v. *Mack Pump Company, Ronald F. Cox and Charles B. Cunningham.*

3,920,267, R. S. Lyon, Jr., MULTIPLE FOLDING BOOKLETS, **filed** Dec. 17, 1976, D.C., S.D.N.Y., Doc. 76–C–5611, *Kurt H. Volk, Inc.* v. *Foundation Christian Living.*

3,928,933, T. Iwamoto, HOLDING TOY, **filed** Dec. 22, 1976, D.C., M.D. Pa. (Scranton) Doc. 76–1542, *ITI Hawaii, Inc. and Takeji Iwamoto* v. *Avlon, Inc.*

3,940,808, P. Bartholomew, PATIENT TRANSFER APPARATUS, **filed** Dec. 20, 1976, D.C. Nebr. (Omaha) Doc. CV 76–0–488, *Bartholomew Petrini* v. *International Medical Equipment and Supply et al.*

3,950,638, Kent, Lemons and Macleod, HIGH INTENSITY INDIRECT LIGHTING FIXTURES, **filed** Dec. 23, 1976, D.C. Colo. (Denver) Doc. 76–W–1216, *Lam Inc.* v. *Johns-Manville Corporation and Johns-Manville Sales Corporation.*

3,957,402. (See 3,910,728.)

3,957,403. (See 3,910,728.)

3,983,656, D. L. Bain, FISHING LURE, **filed** Dec. 16, 1976, D.C., S.D. Miss. (Jackson) Doc. J76–386(C), *Dewey L. Bain* v. *Action Lures Company, Inc.*

D. 235,701, J. P. Famolare, Jr., SHOE SOLE, filed July 8, 1975, D.C., S.D.N.Y., Doc. 75–C–3357, *SCOA Industries, Inc.* v. *Famolare Inc.* Permanent injunction, plaintiff is permanently enjoined from using the trademark "Get There" or any imitation thereof, Dec. 14, 1976.

D. 239,990, H. Olko, ARM CHAIR, filed Aug. 10, 1976, D.C. S.D.N.Y., Doc. 76–C–3541 CLB, *Henry Olko* v. *Federated Department Store Inc.* Complaint is dismissed without prejudice, Dec. 30, 1976.

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

3,332,769, Re. S.N. 783,536, Filed Apr. 1, 1977, Cl. 71/121, METHOD OF ELIMINATING GERMINATING AND SEEDLING WEED GRASSES AND BROADLEAF WEEDS, Quentin F. Soper, Owner of Record: *Eli Lilly and Company, Indianapolis, Ind.,* Attorney or Agent: Arthur R. Whale, et al., Ex. Gp.: 124

3,418,247, Re. S.N. 784,366, Filed Apr. 4, 1977, Cl. 301/4, RARE EARTH ACTIVATED LANTHANUM AND LUTETIUM OXY-CHALCOGENIDE PHOSPHORS, Perry Niel Yocom, Owner of Record: *The Radio Corporation of America, Princeton, N.J.,* Attorney or Agent: Eugene M. Whitacre, et al., Ex. Gp.: 113

3,441,649, Re. S.N. 781,654, Filed Mar. 28, 1977, Cl. 424/315, SUPPRESSION OF CARDIAC VENTRICULAR FIBRILLATION AND CARDIAC ARRHYTHMIAS WITH BRETYLIUM TOSYLATE, Marvin B. Bacaner, Owner of Record: *The Regents of the University of Minnesota, Minneapolis, Minn.,* Attorney or Agent: L. Paul Burd, et al., Ex. Gp.: 125

3,501,306, Re. S.N. 782,812, Filed Mar. 30, 1977, Cl. 96/101, REGULAR GRAIN PHOTOGRAPHIC REVERSAL EMULSIONS, Bernard D. Illingsworth (deceased), Owner of Record: *Eastman Kodak Company, Rochester, N.Y.,* Attorney or Agent: Carl O. Thomas, et al., Ex. Gp.: 166

3,799,532, Re. S.N. 782,980, Filed Mar. 30, 1977, Cl. 267/148, ARTICULATED COIL SPRING CONNECTOR, William L. Schlegel, Owner of Record: *Komline-Sanderson Engineering Corporation, Peapack, N.J.,* Attorney or Agent: Walter D. Ames, Ex. Gp.: 313

3,853,982, Re. S.N. 783,352, Filed Mar. 31, 1977, Cl. 423/68, METHOD FOR RECOVERING VANADIUM-VALUES FROM VANADIUM-BEARING IRON ORES AND IRON ORE CONCENTRATES, Conrad B. Bare, et al., Owner of Record: *Bethlehem Steel Corporation, Bethlehem, Pa.,* Attorney or Agent: Joseph J. O'Keefe, Ex. Gp.: 113

3,874,747, Re. S.N. 783,424, Filed Mar. 31, 1977, Cl. 303/89, FLUID ACTUATED BRAKE LOCKING MECHANISM, Walter Case, et al., Owner of Record: *Inventors,* Attorney or Agent: Kenneth R. Glaser, Ex. Gp.: 315

3,875,316, Re. S.N. 782,556, Filed Mar. 29, 1977, Cl. 426/349, ISOMERISED HOP EXTRACTS, Anthony Martin Humphrey, Owner of Record: *Bush Boake Allen Limited, Walthamstow, England,* Attorney or Agent: Robert D. Flynn, et al., Ex. Gp.: 172

3,926,489, Re. S.N. 783,986, Filed Apr. 4, 1977, Cl. 312/250, APPARATUS AND METHOD FOR USE IN ASSEMBLING FOOD ON TRAYS, Max Gerald Futch, Owner of Record: *Inventor,* Attorney or Agent: Herbert C. Brinkman, Jr., et al., Ex. Gp.: 351

3,961,160, Re. S.N. 781,742, Filed Mar. 28, 1977, Cl. 235/61.11 E, CARD READER, Richard A. Gorgens, Owner of Record: *Incoterm Corporation, Natick, Mass.,* Attorney or Agent: Melvin R. Jenney, et al., Ex. Gp.: 235

3,964,281, Re. S.N. 781,930, Filed Mar. 28, 1977, Cl. 70/120, DOUBLE CYLINDER LOCK BOLT ASSEMBLY, Paul Shipman, Owner of Record: *Inventor,* Attorney or Agent: Howard L. Johnson, Ex. Gp.: 355

3,967,442, Re. S.N. 782,977, Filed Mar. 30, 1977, Cl. 58/23 R, ELECTIC WATCH HAVING AN ELECTROMECHANICAL MOVEMENT INCLUDING A CORRECTION MECHANISM FOR SMALL ERRORS, Jean-Claude Berney, Owner of Record: *Ebauches S. A. Neuchatel (Suisse), Switzerland,* Attorney or Agent: George B. Newitt, et al., Ex. Gp.: 211

3,985,130, Re. S.N. 782,720, Filed Mar. 30, 1977, Cl. 128/132, METHOD OF AND MEANS FOR TREATING BURN VICTIMS, Ronald H. Wideman, Owner of Record: *Poly-Wide, Incorporated, Menasha, Wis.,* Attorney or Agent: James B. Kinzer, et al., Ex. Gp.: 335

3,990,188, Re. S.N. 781,741, Filed Mar. 28, 1977, Cl. 51/7, FINISHING APPARATUS HAVING GYRATIONAL AND ROTATIONAL MOTION-PRODUCING COMPONENTS, Gunther W. Balz, Owner of Record: *Roto-Finish Company, Kalamazoo Mich.,* Attorney or Agent: Gordon W. Hueschen, Ex. Gp.: 323

4,000,320, Re. S.N. 785,407, Filed Apr. 7, 1977, Cl. 426/3, CHEWING GUM WITH IMPROVED STORAGE QUALITIES, Robert Edward Klose, et al., Owner of Record: *Inventors,* Attorney or Agent: John F. Scully, et al., Ex. Gp.: 172

4,007,541, Re. S.N. 785,898, Filed Apr. 8, 1977, Cl. 29/600, METHOD FOR FABRICATING A DIELECTRIC FILLED FERRITE TOROID FOR USE IN MICROWAVE DEVICES, Frank R. Monforte, et al., Owner of Record: *Ampex Corporation, Redwood City, Calif.,* Attorney or Agent: Robert G. Clay, Ex. Gp.: 321

PATENT NOTICES

Certificates of Correction for the Week of May 31, 1977

D. 242,030	3,977,837	4,001,248	4,010,127
D. 243,076	3,978,892	4,001,338	4,010,129
3,615,395	3,980,528	4,001,346	4,010,150
3,745,953	3,980,904	4,001,530	4,010,243
3,777,341	3,981,570	4,001,539	4,010,778
3,809,403	3,981,930	4,001,581	4,010,848
3,826,739	3,982,422	4,001,807	4,010,876
3,845,762	3,982,492	4,001,811	4,011,039
3,846,186	3,982,957	4,002,221	4,011,149
3,885,515	3,983,337	4,002,471	4,011,180
3,855,515	3,984,911	4,002,716	4,011,226
3,857,183	3,985,802	4,002,813	4,011,304
3,865,038	3,986,085	4,002,844	4,011,483
3,879,445	3,988,902	4,003,638	4,011,821
3,883,694	3,989,026	4,003,830	4,011,984
3,884,600	3,989,229	4,003,935	4,011,986
3,885,553	3,989,507	4,003,990	4,012,239
3,887,201	3,989,512	4,004,104	4,012,283
3,897,491	3,991,448	4,005,033	4,012,432
3,906,250	3,991,507	4,005,040	4,012,478
3,913,591	3,991,552	4,005,055	4,012,522
3,923,046	3,992,158	4,005,212	4,012,524
3,929,135	3,992,483	4,005,298	4,012,632
3,929,796	3,992,699	4,005,333	4,012,896
3,928,298	3,993,181	4,005,406	4,012,932
3,932,838	3,993,225	4,005,579	4,012,983
3,934,214	3,993,363	4,005,654	4,013,046
3,935,123	3,995,061	4,005,918	4,013,069
3,937,768	3,995,095	4,006,011	4,013,283
3,949,386	3,995,167	4,006,085	4,013,581
3,955,300	3,995,181	4,006,132	4,013,595
3,959,202	3,996,381	4,006,352	4,013,647
3,961,480	3,996,382	4,006,464	4,013,732
3,962,150	3,997,349	4,006,587	4,013,835
3962,452	3,997,433	4,006,730	4,013,890
3,963,281	3,997,655	4,006,872	4,013,945
3,965,078	3,998,140	4,006,983	4,014,017
3,965,094	3,998,587	4,007,816	4,014,066
3,967,461	3,998,771	4,007,988	4,014,200
3,970,674	3,998,845	4,008,721	4,014,286
3,970,722	3,998,906	4,008,748	4,014,338
3,973,110	3,999,164	4,008,804	4,014,346
3,974,235	3,999,502	4,008,931	4,014,567
3,974,479	3,999,658	4,009,251	4,015,163
3,974,546	4,000,069	4,009,781	4,015,441
3,976,549	4,000,396	4,009,829	4,016,200
3,977,234	4,000,844	4,009,917	

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF MAY 7, 1977

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	8-2-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	7-26-76
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	5-4-76
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	8-27-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	7-12-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	11-26-75
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	3-15-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	6-1-76
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	11-22-76
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	5-3-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	10-28-75
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	5-24-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	9-10-76
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	6-1-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	6-11-76
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors: Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	10-12-76

Expiration of patents: The patents within the range of numbers indicated below expire during May 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,934,766 to 2,939,144, inclusive
Plant Patents..... Numbers 1,938 to 1,948, inclusive

PATENT EXAMINING CORPS
JOHN D. TOUTALIS, Assistant Commissioner
WILLIAM THOMAS, Deputy Assistant Commissioner
CONDITIONS OF PATENT APPLICATIONS OF MAY 1, 1917

REISSUES

MAY 31, 1977

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 29,235

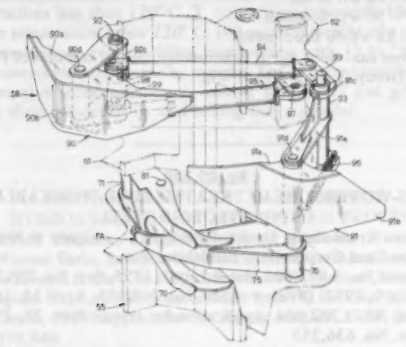
MULTIPLE TREE HARVESTER OF THE FLEXIBLE ARM TYPE

John Kurelek, Brantford, Canada, assignor to Koehring Canada Limited, Brantford, Canada

Original No. 3,875,983, dated Apr. 8, 1975, Ser. No. 458,327, Apr. 5, 1974. Application for reissue Jan. 2, 1976, Ser. No. 646,001

Int. Cl.² A01G *23/08*

U.S. Cl. 144—3 D **15 Claims**



1. A multiple tree harvester for cutting and accumulating trees, one at a time, said harvester having a support frame, a first pair of arms and a second pair of arms movably mounted on said support frame for cooperating to gather a plurality of trees, one at a time, said pairs of arms being vertically spaced apart on said support; said pairs of arms being movable between an open, tree receiving position and a closed, tree holding position; power means attached to each of said pairs of arms and for selectively moving each of said pairs of arms between their open tree receiving position and their closed, tree holding position; each of the arms of at least one of said pair of arms having an inner part movably mounted on said support frame and having a free end, and an outer part pivotally mounted generally intermediate its length to said inner part adjacent a free end thereof, whereby when said one of said pairs of arms is moved to its said open position, said outer parts can pivot on their said inner parts and thereby be withdrawn in generally opposite lateral directions and out from between an accumulated tree and a succeeding tree clampingly engaged thereagainst by the other pair of arms; and power operated tree severing means located generally below said arms for severing said trees which are to be accumulated.

Re. 29,236

DOOR ASSEMBLY INCLUDING INSERT STORING MEANS

Anthony R. Mennuto, 769 Pascack Road, Paramus, N.J. 07652

Original No. 3,891,020, dated June 24, 1975, Ser. No. 430,727, Jan. 4, 1974. Application for reissue Dec. 16, 1975, Ser. No. 641,339

Int. Cl.² E06B *1/00, 5/00, 9/00*

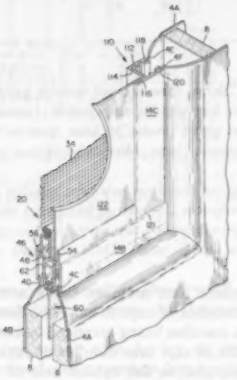
U.S. Cl. 160—37 **9 Claims**

1. In a door assembly of the type including a pair of panels and a core sandwiched between the panels, the panels having portions which surround a substantially rectangular opening in the upper part of the door, and a frame adjacent the panel portions for defining the opening and for supporting a removable insert therein, the improvement comprising:

the frame including top, bottom and a pair of side members adjacent corresponding panel portions for defining the opening and for supporting the removable insert therein, the top and side members are stationary in the opening and the bottom frame member is removable for exposing a portion of the core in the lower part of the door and which removable frame member separates the upper and lower parts of the door;

the exposed core portion arranged for providing a channel which receives the insert for storage when the insert is removed from the frame;

the stored insert is disposed between the panel portions adjacent the bottom frame member and includes a portion which extends beyond the panel portions;



the bottom frame member includes a downwardly extending first channel portion and an upwardly extending second channel portion;

the first channel portion receives the portion of the stored insert which extends beyond said panel portions adjacent the bottom frame member, and is adjacent said insert and panel portions;

the second channel portion cooperates with the top and side frame members for retaining an interchangeable second insert in the opening when the first mentioned insert is in storage; and

the second channel portion, top and side frame members and second insert cooperate to retain a decorative member in front of said insert when the insert is retained in the opening.

Re. 29,237

ZOOM LENS FOR SUPER 8 FILM

Trude Muszumanski, Vienna, and Helmut Gela, Maria-Enzersdorf, both of Austria, assignors to Karl Vockenhuber and Raimund Hauser, both of Vienna, Austria

Original No. 3,784,283, dated Jan. 8, 1974, Ser. No. 133,818, Apr. 14, 1971. Application for reissue Dec. 18, 1975, Ser. No. 642,194

Claims priority, application Austria, Apr. 17, 1970, 3533/70

Int. Cl.² G02B *15/16*

U.S. Cl. 350—184 **4 Claims**

1. A zoom lens, which comprises

a main lens unit having a fixed focal length and consisting of a positive lens member, and

an afocal forward lens unit preceding said main lens unit and having a variable magnification,

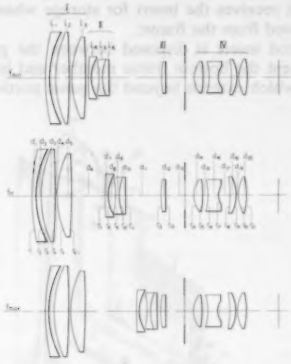
said forward lens unit consisting of a positive forward lens

member, a negative intermediate lens member which is axially movable to change the magnification, and a positive rear lens member,

the positive forward lens member of the afocal part consists of a negative [meniscue] *meniscus* lens element convex towards the front followed by two biconvex lens elements,

said negative intermediate lens member consists of a negative [meniscue] *meniscus* convex toward the front followed by a negative doublet composed of a biconcave lens cemented to a positive lens element,

said positive rear lens member consists of a biconvex lens element,



said intermediate lens member being arranged to direct divergent bundles of rays to said rear lens member,

said rear lens member being arranged to convert said divergent bundles of rays into bundles of rays which are substantially parallel to the optical axis of the lens and to direct them to said rear lens member,

said forward lens member being axially movable to control the position of the image plane, and

said lens being designed to meet the condition

$$f_{min} - f_{11} < 6y$$

where f_{min} is the smallest focal length of the lens, f_{11} the focal length of said intermediate lens member, and 2y the image field diagonal.

Re. 29,238

COMPOSITES OF LIGNIN AND BIOLOGICALLY ACTIVE MATERIALS

Mitchell S. Dimitri, Charleston, and Sten I. Falkehag, Mount Pleasant, both of S.C., assignors to Westvaco Corporation, New York, N.Y.

Original No. 3,929,453, dated Dec. 30, 1975, Ser. No. 401,375, Sept. 27, 1973. Application for reissue Mar. 17, 1976, Ser. No. 667,630

Int. Cl.² A01N *9/12*

U.S. Cl. 71—101 **2 Claims**

3. A process for making a controlled release herbicide containing composite which consists essentially of:

a. emulsifying an aqueous slurry containing [at least an effective amount of] 2-chloroallyl diethyldithiocarbamate and an alkali lignin at a weight ratio of greater than 1:1 to 1:4 of 2-chloroallyl diethyldithiocarbamate to alkali lignin,

b. acidifying said emulsion with a mineral acid to a pH between about 2 and 6, to thereby precipitate said 2-chloroallyl diethyldithiocarbamate/alkali lignin, physically absorbing the 2-chloroallyl diethyldithiocarbamate throughout the alkali lignin matrix to form a micro dispersion, and

c. drying said precipitated materials, said controlled release composite containing an effective amount of herbicide.

Re. 29,239

TERNARY ALLOYS

Jacob Hyner, and Robert A. Michelson, both of Waterbury, Conn., assignors to Whyco Chromium Company Inc., Thomaston, Conn.

Original No. 3,881,919, dated May 6, 1975, Ser. No. 431,025, Jan. 7, 1974. Application for reissue Sept. 17, 1975, Ser. No. 614,349

Int. Cl.² C22C *13/00*

U.S. Cl. 75—175 R **2 Claims**

1. A bright, tarnish resistant and color stable ternary alloy consisting essentially of about

40 – 90 wt. % tin

10 – 50 wt. % cobalt

1 – 28 wt. % third metal

wherein said third metal is antimony, *zinc* or a metal of Periodic Group [II_B,] III_A or VI_B.

Re. 29,240

AS-WORKED, HEAT TREATED COLD-WORKABLE HYPOEUTECTOID STEEL

Helmut Kranenberg, Orchard Park, N.Y., assignor to Bethlehem Steel Corporation, Bethlehem, Pa.

Original No. 3,892,602, dated July 1, 1975, Ser. No. 358,751, May 9, 1973. Division of Ser. No. 242,473, April 10, 1972, Pat. No. 3,762,964. Application for reissue Nov. 28, 1975, Ser. No. 636,253

Int. Cl.² C22C *39/00*; C21D *7/14*

U.S. Cl. 148—36 **2 Claims**

1. A heat treated hypoeutectoid steel consisting essentially of about 0.30 to about 0.80% carbon and the remainder iron and incidental impurities characterized by having good formability and a microstructure comprising fine well-dispersed spheroidal carbides having a size of [not more than 0.3] *about 0.5 to 2.5* microns in a ferritic matrix, said ferritic matrix being free of lamellar carbides and having a grain size of about three microns to about ten microns.

Re. 29,241

WATER CLARIFICATION PROCESS

Mahmoud T. Dajani, Chicago, Ill., assignor to Nalco Chemical Company, Oak Brook, Ill.

Reissued No. Re. 27,275, dated Jan. 18, 1972, Ser. No. 85,832, Nov. 16, 1965.

Original No. 3,409,547, dated Nov. 5, 1968, Ser. No. 508,159, Oct. 30, 1970. Continuation of Ser. No. 388,939, Aug. 16, 1973, abandoned. Application for reissue May 30, 1975, Ser. No. 582,375

Int. Cl.² B01D *21/01*

U.S. Cl. 210—54 **5 Claims**

1. A process for clarifying water which has solid materials suspended therein and which has at least 0.1 p.p.m. of residual chlorine comprising the steps of adding a minor amount of a *condensation* polymer [[*of ammonia and ethylene dichloride*]] **selected from the group consisting of ammonia and polyalkylene polyamine with epichlorohydrin, and ammonia with ethylene dichloride** which contains a plurality of basic nitrogen sites in form of quaternary groups to said water to coagulate said suspended solids, and thereafter separating said solids from said water.

Re. 29,242

NOVOLAK MOLDING COMPOUNDS CONTAINING HEXAMETHYLENETETRAMINE MONOMETABORATE

Kurt Schmoll, Hangelar-Niederberg, Germany, assignor to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany

Original No. 3,563,952, dated Feb. 16, 1971, Ser. No. 861,515, Sept. 26, 1969. Continuation of Ser. No. 627,248, March 23, 1969, abandoned. Application for reissue July 15, 1975, Ser. No. 596,047

Claims priority, application Germany, Mar. 24, 1966, 49680

Int. Cl.² C08G *5/06, 51/18*

U.S. Cl. 260—59 R 4 Claims

1. A process for the manufacture of a phenol formaldehyde resin molding composition capable of rapidly hardening at a molding temperature greater than 120° [and having good thermal stability and flow characteristics at plasticizing temperatures less than 120° C.,] comprising intimately blending *at a temperature below 120° C.* 100 parts by weight of a phenol formaldehyde resin molding composition with 12 to 19 parts *hexamethylenetetramine* by weight [of] *as* hexamethylenetetramine monometaborate, rolling said blend and grinding the sheet produced by said rolling *into a powder.*

Re. 29,243

POLYALKYLENE GLYCOL ETHERS OF HYDROXYALKYLMERCAPTANS AND PROCESS

Wilfried Umbach, Langenfeld; Rainer Mehren, Wesel, and Werner Stein, Erkrath-Unterbach, all of Germany, assignors to Henkel & Cie G.m.b.H., Dusseldorf-Holthausen, Germany

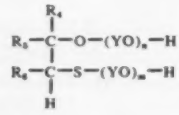
Original No. 3,661,851, dated May 9, 1972, Ser. No. 863,350, Oct. 2, 1969. Application for reissue May 19, 1975, Ser. No. 578,546

Claims priority, application Germany, Oct. 8, 1968, 1801712

Int. Cl.² C07C *149/18*

U.S. Cl. 260—609 R 3 Claims

1. Polyalkylene glycol ethers of β-hydroxymercaptans of the formula



wherein R_4 is an alkyl having from 1 to 22 carbon atoms, R_5 and R_6 are members selected from the group consisting of hydrogen and alkyl having from 1 to 21 carbon atoms, with the proviso that the sum of the carbon atoms in R_4, R_5 and R_6 is from 4 to 22; Y is alkylene having from 2 to 4 carbon atoms; n is an integer from [0 to 50] *1 to 30*; m is an integer from [1 to 50] *2 to 30*; and the sum of n and m is an integer from [1 to 50] *4 to 30.*

Re. 29,244

COCCIDIOSTATS

Julius Berger, Passaic, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Original No. 3,719,753, dated Mar. 6, 1973, Ser. No. 804,974, Mar. 6, 1969. Continuation-in-part of Ser. No. 672,729, Oct. 4, 1967, abandoned. Application for reissue July 2, 1976, Ser. No. 702,307

Int. Cl.² A61K *35/00*

U.S. Cl. 424—122 4 Claims

1. The method of combating coccidiosis in poultry which comprises orally administering to said poultry an amount sufficient for treating or preventing coccidiosis of antibiotic X-537A, or pharmaceutically acceptable salts thereof wherein the amount of antibiotic comprises from about 0.001% to about 0.0125% by weight of the daily feed consumption in an inert orally ingestible carrier.

Re. 29,245

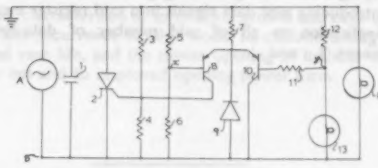
VOLTAGE REGULATOR FOR ALTERNATING CURRENT LIGHTING SYSTEM

Floyd M. Minks, Rte. 1, Box 66, Kissimmee, Fla. 32741

Original No. 3,924,154, dated Dec. 2, 1975, Ser. No. 417,773, Nov. 21, 1973. Application for reissue Feb. 23, 1976, Ser. No. 660,139

Int. Cl.² B60Q *1/08*; G05F *1/44*

U.S. Cl. 315—78 21 Claims



16. In a lighting system for use with an AC power producing source the frequency, voltage, amplitude and waveform of which vary from time to time, said AC source being coupled to lighting means for being energized thereby, said lighting system comprising:

a true RMS voltage sensitive network having terminals connected to be energized by the AC waveform of said source and having output terminals for producing a signal dependent upon the true RMS value of the voltage from said source;

control means for controlling the flow of power from said source to said lighting means, said control means having an input thereto;

two amplifying means each having an input terminal, an output terminal and a common input-output terminal, said common input-output terminals of said amplifying means being coupled together, said output terminal of one of said amplifying means supplying power to said input of said control means, said input terminals of said amplifying means being coupled to said output terminals of said true RMS voltage sensitive network;

impedance means for bypassing destructive voltages and currents from between said input terminals and said common input-output terminals of said amplifying means from the AC waveform applied to said network, thereby preventing the RMS voltage supplied from said source to said lighting means from exceeding a predetermined value.

Re. 29,246

DATA TRANSFER CONTROL APPARATUS AND METHOD

David W. Ricci, Mountain View, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Original No. 3,810,103, dated May 7, 1974, Ser. No. 240,403, Apr. 3, 1972. Application for reissue Apr. 28, 1976, Ser. No. 680,812

Int. Cl.² H04Q *1/00*

U.S. Cl. 340—172.5 20 Claims

1. Data transfer apparatus comprising:

source means of data signals including register means for storing data signals to be transferred [;] , *said source means producing a logic signal after introduction of data signals into the register means and in response to an applied control signal, the logic signal being representative of the validity of data signals to be transferred;*

a number of data-receiving means for operating upon applied data signals from the source means [,] *in response to appearance of said logic signal,* each of said number of data-receiving means including means for providing a

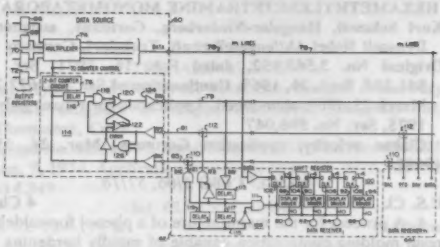
first output indication of the operability thereof on applied data signals and means for providing a second output indication of the completed acceptance of applied data signals [, independently of the operation thereof on such applied data signals];

means coupling data signals from said source means to each of said number of data-receiving means;

means responsive to the appearance of second outputs from all of said number of data-receiving means for terminating the data signals applied to each of said number of data-receiving means from said source means; and

means responsive to the appearance of said first outputs from all of said number of data-receiving means for applying a control signal to [a] *the* source means [for introducing new data signals into said register means for application to all of said number of data-receiving means.] *; and*

means responsive to the appearance of second outputs from all of said number of data-receiving means for applying a



signal to said source means for terminating said logic signal and introducing new data signals into said register means.

PLANT PATENTS

GRANTED MAY 31, 1977

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,056

MUSCADINE GRAPE

Byard Owens Fry, 612 Terrace St., Griffin, Ga. 30223

Filed Sept. 5, 1975, Ser. No. 610,576
Int. Cl.[2] A01H *5/03*
U.S. Cl. Plt.—47 **1 Claim**

1. The new and distinct hybrid plant variety of the muscadine grape as described and illustrated which is primarily distinguished as to novelty by the unique combination of a very vigorous vine, very large fruit of a dark almost black color wherein said fruit occurs in large clusters of individual berries having a diameter of from about 1 inch to about 1-3/16 inch and the fruit sugar content of the individual berries ranges from about 17.8 to about 22.5 percent.

4,057

ROSE PLANT NAMED ROYALTY

Robert G. Jelly, Richmond, Ind., assignor to E. G. Hill Co., Inc., Richmond, Ind.

Filed May 6, 1976, Ser. No. 683,905
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—29 **1 Claim**

1. A new and distinct cultivar of rose plants "Forever Yours" × "Love Affair" substantially as herein shown and described, characterized by its uniform growth and cane quality with less occurrence of blind wood, its uniform timing and improved vase life, and the slower opening of its buds when ready to cut and its improved opening flower form.

4,058

ORCHID NAMED TENERIFE

Maurice Lecoufle, and Michel Vacherot, both of Boissy-St.-Leger, France, assignors to Les petits-fils et Fils de Vacherot & Lecoufle, Boissy-St.-Leger, France

Filed May 26, 1976, Ser. No. 690,253
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct seedling cultivar of orchid Oda Balek × Odm. Pacha, substantially as herein shown and described, characterized as to novelty by the overall deep red color of its flowers and the distinctive flower form which generally conforms with an equilateral rectangular shape.

PATENTS

GRANTED MAY 31, 1977

ERRATA

For CLASS	See PATENT NO.
241–014	4,025,990
428–594	4,025,991
131–225	4,026,019
030–233	4,026,028
040–336	4,026,033
181–036 A	4,026,072
084–411 R	4,026,185
116–118 R	4,026,239
123–119 F	4,026,280
241–169.1	4,026,490
224–045 R	4,026,501
271–151	4,026,550
297–445	4,026,567
305–054	4,026,608
350–298	4,026,641
355–001	4,026,642
355–003 DD	4,026,643
428–649	4,026,677
260–584 C	4,026,807
160–046	4,026,867
424–282	4,026,896
128–213	4,027,061
013–009 R	4,027,095
235–007 R	4,027,140
235–144 ME	4,027,144
250–536	4,027,169
361–213	4,027,201
361–033	4,027,202
361–098	4,027,203
361–001	4,027,204
361–384	4,027,205
361–384	4,027,206
361–404	4,027,207
361–194	4,027,208
361–361	4,027,209
322–050	4,027,229
235–151.11	4,027,245
235–151.1	4,027,246
325–141	4,027,276
354–201	4,027,327

PATENTS

GRANTED MAY 31, 1977

ERRATA

PATENTS

GRANTED MAY 31, 1977

NOTE—Cross reference listings of applications published under the first and second Trial Voluntary Protest Programs are located in the back of this Issue. These entries will be in numerical order by document publication number.

GENERAL AND MECHANICAL

4,025,961
CAPE FOR DEALING WITH THE HAIR
Rita Moore Peters, 952 Walnut St., Allentown, Pa. 18102
Filed Dec. 12, 1975, Ser. No. 640,039
Int. Cl.² A41D *3/08*
U.S. Cl. 2—88 **6 Claims**

1. A setup for protection from materials used in work upon the hair, comprising an outer and an inner cape, each extending outward from contact with the lower neck to cover at least the entire shoulders and the portions of chest and back between the shoulders, the outer cape being of plastic and the inner cape of Turkish toweling-type material but the two capes being otherwise similar to each other, each cape having a body and two tongues each of which tongues extends from the body to a far end respectively and the two tongues having a space between them for the neck of the person, each cape having lobes extending outward from the base of the respective tongues and the lobes having their outer edges extending from the point of junction with the base of the respective tongues curvingly in a direction outwardly and away from the far ends of the tongues, there being on each cape at least two cooperating contact fastener pairs each of which includes the one cooperating contact element on the face of a different tongue near the far end of that tongue and the second cooperating contact element on a cooperating face of the lobe further from that tongue near the base of the other tongue, and there being loops located on the respective lobes near the base of the respective tongues and extending out from the same face of the respective lobes as the second cooperating element is respectively located on, the capes being adapted to be held together around a person's shoulders in any one of three alternative different ways.

4,025,962
POOL GLOVE
Donald H. Hartung, Waukesha, Wis., assignor to Cue Products, Inc., Waukesha, Wis.
Filed Mar. 1, 1976, Ser. No. 662,944
Int. Cl.² A41D *19/00*
U.S. Cl. 2—161 A **1 Claim**

1. A glove for use by pool players which covers only a portion of the palm of the hand and has stalls for receiving and sheathing the thumb and the first and second fingers and leaving the third and fourth finger exposed, said stalls being provided from clothlike, elastic, flexible material capable of absorbing perspiration produced by the wearer and which closely sheaths the thumb and said first and second fingers and provides for secure engagement of a pool cue disposed to extend between the first and second fingers and over the thumb but permitting ready slippage of the cue therethrough, additional material joining the stalls and extending over a portion of the back and the palm of the hand, means to secure the glove to the hand of the wearer, and with the uncovered portion of the hand and the third and fourth fingers providing a solid foundation for support of the hand when the third and fourth fingers and uncovered portion of the palm of the hand are placed in engagement with the cushion of a pool table preparatory to engaging a ball with a cue.

4,025,963
PRINTED CLOTH
Kiyo Sugita, 21-15, Irumagawa 2-chome, Sayama 350-13, Japan
Continuation-in-part of Ser. No. 474,301, May 29, 1974, abandoned. This application June 16, 1975, Ser. No. 587,239
Int. Cl.² A41D *27/00*
U.S. Cl. 2—243 B **6 Claims**

1. In a cloth, separate printed sections having a main design and with each section being defined by a border edge, and adapted, when cut from the cloth, to be assemble into a garment, the respective separate printed sections having, along at least a portion of the respective border edges additional printed sections defining facing for an associated respective separated printed section of the garment and being contiguous thereto, said additional printed sections being so configured that when the cloth is cut along the border edge of said respective separate printed sections, spaced from the border edge contiguous with said respective additional printed sections, and along an outer peripheral edge of said respective additional printed sections, the additional printed sections remain attached to their associated separate printed sections having the main design and are foldable to, and in matching relationship with said respective separate printed sections, whereby said separate sections can be secured together and said additional printed sections can be turned up, on said separate

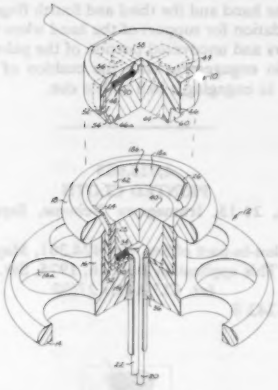
printed sections having the main design, for securement as facings thereto.

4,025,964

MAGNETIC ELECTRICAL CONNECTORS FOR BIOMEDICAL PERCUTANEOUS IMPLANTS

Lester J. Owens, Titusville, Fla., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed July 30, 1976, Ser. No. 709,849
Int. Cl.² A61F 1/00
U.S. Cl. 3—1 6 Claims



1. A biomedical percutaneous connector for providing electrical connection between electrical conductors located externally of a patient's body and electrical conductors implanted underneath the patient's skin, said connector comprising:

a. pair of mating connector elements;

b. a magnet carried within one of said mating connector elements;

c. magnetic material carried within the other of said mating connector elements;

d. one of said mating connector elements being a female socket including:

i. a hollow portion having an outer end portion thereof adapted to be extended outwardly through said patient's skin;

ii. an inclined inner wall surface provided on said outer end portion to form a conical recess within said hollow portion;

iii. inclined electrically conductive contacts positioned adjacent said inclined inner wall surface and connected to said electrical conductors implanted underneath said patient's skin;

e. the other end of said mating connector elements being a male plug including:

i. a non-conductive body having an inclined outer wall surface complementary in shape to said conical recess within said female socket;

ii. inclined electrically conductive contacts carried on said inclined outer wall surface and connected to said electrical conductors located externally of said patient's body;

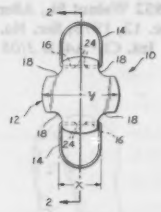
f. whereby when said male plug is inserted in said conical recess of said female socket, said inclined electrically conductive contacts thereof are held in wedging engagement with each other by the magnetic force between said magnet and said magnetic material.

4,025,965

INTRAOCULAR LENSES

Walter P. Siegmund, Woodstock, Conn., assignor to American Optical Corporation, Southbridge, Mass.

Filed Mar. 16, 1976, Ser. No. 667,318
Int. Cl.² A61F 1/16, 1/24
U.S. Cl. 3—13 7 Claims



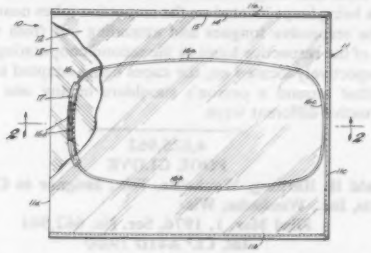
1. A pseudophakos comprising a lens having uninterrupted smoothly optically finished opposite anterior and posterior sides and a pair of open-ended tangentially directed holes, one extending parallel to the other adjacent opposite sides of said lens, an iris clip of wire having opposite ends extended into and fixed against accidental withdrawal from each of said holes, said clip being in the form of a loop extending from said holes rearwardly away from said posterior surface of said lens a substantial distance and thence generally laterally thereof whereby marginal portions of the iris diaphragm of an aphakic eye may be positioned between said posterior surface of said lens and said laterally directed looped portions of said clips for fixation of the pseudophakos in the eye.

4,025,966

PORTABLE AND COLLAPSIBLE SITZ BATH RECEPTACLE

Raymond Rubin, 345 Ocean Drive, Miami Beach, Fla. 33139

Filed June 24, 1976, Ser. No. 699,236
Int. Cl.² A47K 3/22, 11/08
U.S. Cl. 4—6 4 Claims

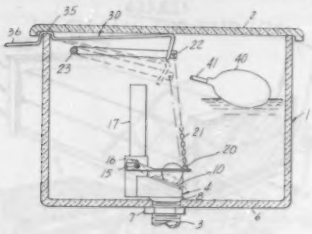


1. A portable and collapsible receptacle providing a sitz bath when installed on the rim of a toilet bowl beneath the seat, comprising an envelope of water impervious and pliable sheet material sized and shaped to rest on and overlap said toilet bowl rim, a relatively rigid frame within said envelope having a width narrower than the envelope and a length sufficient to rest on rear and front portions of the toilet bowl rim as a support for the envelope, said frame being free within said envelope for relative movement of the sheet material of the envelope with respect to the frame permitting the envelope when positioned on said toilet bowl rim to be depressed in a center portion thereof to provide a bowl for filling with liquid for said sitz bath.

4,025,967
TOILET TANK FLUSHING APPARATUS

Brooks Walker, 1280 Columbus Ave., San Francisco, Calif. 94133

Filed Apr. 1, 1976, Ser. No. 672,660
Int. Cl.² E03D 1/34
U.S. Cl. 4—67 R 6 Claims



1. In a toilet tank having a flush valve, a mechanism for shifting said valve, said mechanism comprising a lever which is connected with said valve and movable from a lower position with said valve closed to an upper position for opening said valve, the improvement that comprises:

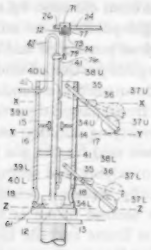
a manually actuatable arm in addition to said mechanism and having an outer end positioned outwardly of said tank and an opposite inner end within said tank in a position to engage said actuator to move the latter upwardly to open said valve, and

stop means for limiting upward movement of said arm to a position at which said actuator is intermediate said upper and lower positions.

4,025,968
WATER AND ENERGY SAVING CLOSET TANK FLUSH VALVES

Deane N. Davis, Yountville, Calif., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Apr. 12, 1976, Ser. No. 676,312
Int. Cl.² E03D 1/34
U.S. Cl. 4—67 A 1 Claim



1. A toilet tank flush valve system which permits emptying of the tank from the normal storage level to either one of two pre-set water levels comprising

a drain valve structure installed in a toilet tank in the form of a non-flotable hollow valve member fixed to a hollow support stem slidably mounted to a fixed support structure, said valve member adaptable to seating upon and closing a drain outlet at the bottom of an installed toilet tank,

said fixed support structure being in the form of a hollow vertical tube concentrically mounted about the said support stem and valve member, with said tube fixed about the drain outlet of the toilet tank, said tube extending upwards above said drain outlet, said tube formed with a through opening at its lower end to permit water to flow from said tank into the drain outlet when the valve member is unseated from the drain outlet, with

a first float mounted to a first float lever pivotally fixed to said support structure and a second float mounted to a second float lever pivotally fixed to said support structure, with each float lever extending through an opening in the tube of the support structure, and with the float of each float lever fixed to the first end section of its respective float lever that extends externally beyond the said tube, with each of the two float levers fitted at its second end section, that extends inside the said tube, with individual means to engage the support stem when the individual float of the float lever is in a first position in which it is buoyed by water in the tank at or above the level of the respective float, said means being free of engagement with the support stem when the respective float has rotated to a second position of lesser buoyancy than the first position in response to a lowering of the level of water in the tank,

said means of engagement serving to limit downward movement of the said support stem, while permitting upward movement of the support stem in the installed position, in the first position of each float,

said float levers located on the support structure such that each float is responsive to a different level of water in the tank in individually rotating from the first position to the second position, with

the support stem linked to an operating lever fixed to a handle structure mounted to the wall of a toilet tank, said handle structure fitted with means to vertically lift the support stem alternately to either a first position of limited travel or a second position of full travel, said support stem engaging the first float lever when initially moved to said first position limited travel and engaging the second float lever when moved to said second position of full travel, when the tank contains water at the normal storage water level of the tank, together with

a refill supply tube extending freely into the top opening of the hollow support stem and located so as to not interfere with vertical movement of said stem, such that water flowing out of said refill tube into the interior of the hollow support stem will flow through the hollow valve member into the drain outlet, when said valve member is seated or unseated upon the drain outlet.

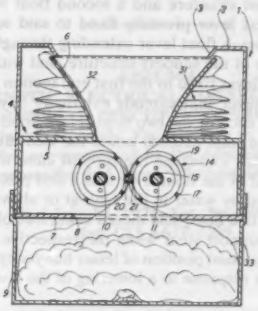
4,025,969
SANITARY CLOSET

Gunnar John Dahlen, Partille, Sweden, assignor to Trailer Finans AB, Kristinehamn, Sweden

Filed Sept. 18, 1975, Ser. No. 614,673
Claims priority, application Sweden, Sept. 20, 1974, 7411838
Int. Cl.² A47K 11/02
U.S. Cl. 4—142 1 Claim

1. A sanitary closet having a bowl and therebelow a device for directing a substantially continuous hose of resilient material through the bowl and said device and further downwardly into a collecting section locating below said device, the device comprising two rotatably mounted roller means arranged for so directing said hose by mutual rotation of the roller means with the hose extending therebetween, at least one of said roller means being provided with closing elements arranged to close the hose temporarily and intermittently in a position of the roller means between said collecting section and said bowl by firmly compressing the hose, spaces defined by said closing elements and arranged to permit the passage of portions of the hose inflated by the contents thereof, resilient means positioned in said spaces comprising endless resilient stretchable loops, which are connected to the roller means and extend within said spaces and adapted to compress the hose around

the material therein contained to squeeze out any air entrapped in the hose and direct the same to the upper part of



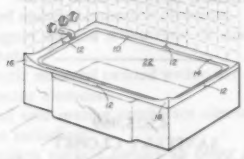
the hose while permitting the said material to pass within the hose between the roller means.

4,025,970

SPLASH GUARD FOR BATHTUBS

Randy R. Robust, 35 Odeon Court, Carney, Md. 21234

Filed Oct. 30, 1975, Ser. No. 627,074
Int. Cl.² A47K *3/00*; A47J *47/20*; E03C *1/181*
U.S. Cl. 4—173 R 2 Claims



1. A splash guard for water-containing structures such as bathtubs and the like, comprising:

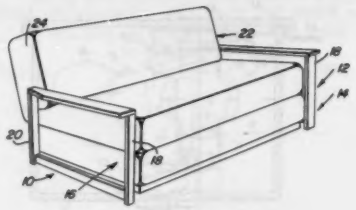
a guard having a plurality of L-shaped guard members, each of said guard members having arms intersecting at 90° angles, said guard members fitting together at the ends of said arms to form a continuous horizontal wall-like barrier around the periphery of the water-containing structure, each said guard member having inwardly sloping inner wall surfaces, said guard members having their longitudinal axis horizontally disposed about the upper periphery of the water containing structure, said guard having at least one corner portion on the guard member, the said corner portion being greater in height at its highest point than adjacent points along the upper edge portion of the guard members, said inwardly sloping inner wall surfaces of the guard member being concavely formed, and the outer wall surfaces of said guard member fitting flushly with vertical side wall of the water-containing structure.

4,025,971

CONVERTIBLE SOFA BED

Carmine De Maria, 39 E. Madison Ave., Collingswood, N.J. 08108

Filed Nov. 11, 1975, Ser. No. 630,882
Int. Cl.² A47C *17/06*
U.S. Cl. 5—18 R 6 Claims



1. A convertible sofa bed including a main frame including upright side portions having front and rear ends, an upstanding backrest section supported from said frame, including a lower marginal portion and projecting upwardly above the rear ends of said opposite side portions, a pair of substantially parallel front and rear support arms disposed at opposite sides of said main frame and pivotally supported at a first pair of corresponding ends from lower portions of forward and intermediate portions of the corresponding side of said main frame for swinging about horizontal transverse axes between first substantially upright positions with the other pair of corresponding ends uppermost and second rearwardly projecting generally horizontal positions with said other pair of ends disposed rearmost, a first horizontal seat frame including front and rear marginal portions and opposite side portions to intermediate and rear portions of which the other pair of ends of the corresponding support arms are pivotally secured for swinging about horizontal transverse axes a second seat frame including front and rear marginal portions, means supporting said second frame from and in position overlying said first frame independent of direct connection of said second frame with said main frame side portions and for forward extending movement of said second frame relative to said first frame, after the latter has been elevated by swinging of said support arms to their upright positions, to an extended position with only the rear marginal portion of said second frame supported from the front marginal portion of said first frame, said second frame including downwardly extendable support leg means mounted from the front marginal portion thereof, and a pair of cushion sections overlying said first and second frames to form a bed mattress when said frames are forwardly extended and with said cushion overlying said second frame positionable, in superposed vertically stacking relation, on said first frame cushion when the second frame is to be rearwardly shifted relative to said first frame and the latter is to be swung rearwardly and downwardly to a position with said support arms in said second positions thereof and with the rear marginal portion of the uppermost stacked cushion section closely underlying the lower marginal portion of said backrest section, at least one of said front support arms and the corresponding side main frame portion front end including deactivatable coacting latch means deactively retaining said front support arms in said first positions thereof, said second seat frame being supported from said first seat frame for horizontal front to rear shifting relative thereto between its forwardly extending and superposed position relative thereto, said second seat frame including latch means deactivating means operative to automatically deactivate said latch means in response to shifting of said second seat frame from is forwardly displaced position toward its superposed relative to said first seat frame past an intermediate position.

4,025,972

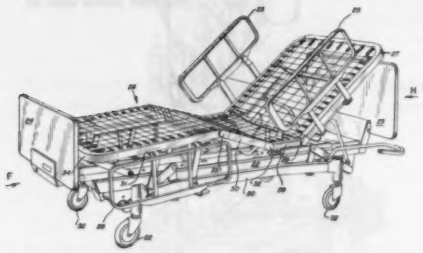
ELEVATING AND TRENDELENBURG MECHANISM FOR AN ADJUSTABLE BED

James S. Adams; William H. Peck, and Daniel R. Tekulve, all of Batesville, Ind., assignors to Hill-Rom Company, Inc., Batesville, Ind.

Continuation-in-part of Ser. No. 496,212, Aug. 9, 1974, Pat. No. 3,958,283. This application Oct. 16, 1975, Ser. No. 623,023

Int. Cl.² A61G 7/00; E03D 1/34

U.S. Cl. 5—68 7 Claims



1. In an adjustable bed having a main frame and an elevating frame interconnected by links constrained for rotation with torque tubes pivotally journaled on one of said frames; an improved locking system for maintaining at least one end of said bed in an elevated position relative to the other end, said system comprising:

a. at least one torque drive arm extending from and constrained for rotation with one of said torque tubes;

b. a yoke pivotally mounted on said tube and rotated by an electric motor carried on said elevating frame for engaging and rotating said drive arm and said one torque tube;

c. hook means carried by said elevating frame for engaging and locking said drive arm and said one torque tube in an elevated position; and

d. a pivotal abutment mounted on said elevated frame for precluding release of said hook means in the absence of actuation of said electric motor.

4,025,973

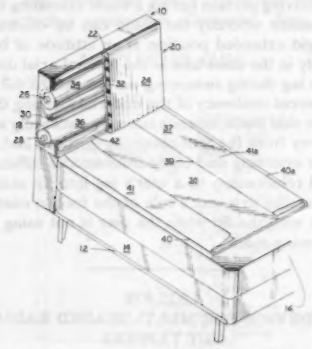
HEADBOARD SHEET DISPENSER

Ernest Walbrecht, 26 Bank St., Midland Park, N.J. 07432

Filed Oct. 21, 1975, Ser. No. 624,480

Int. Cl.² A47C 21/00

U.S. Cl. 5—317 R 10 Claims



1. A headboard sheet dispenser adapted for use with a bedframe comprising:

a. a chamber within the headboard higher than the bed frame adapted to cooperate with a standard bed frame, the chamber defined by peripheral walls, and a slot opening defined in one of said peripheral walls to permit the exit therethrough of said sheets, and which contains

b. a spool for retaining a roll of sheets for use;

c. a second spool for storing a spare roll of bed sheets; and

d. a means employing a weighted roller for dispensing bed sheets.

4,025,974

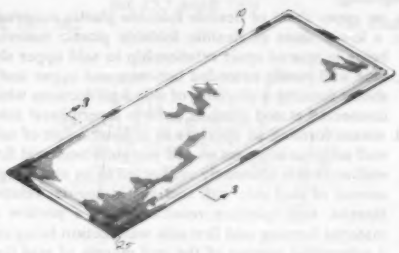
AIR MATTRESS AND METHOD OF MAKING THE SAME

James M. Lea, 1207 NW. Culbertson Drive, Seattle, Wash. 98177, and Neil P. Anderson, 3105 N. 29th St., Tacoma, Wash. 98407

Continuation-in-part of Ser. No. 216,702, Jan. 10, 1972, Pat. No. 3,872,525. This application Dec. 10, 1974, Ser. No. 531,301

Int. Cl.² A47C 27/08

U.S. Cl. 5—367 4 Claims



1. A self-inflating air mattress capable of being conveniently rolled into a compact stowed position and capable of providing adequate support for a person at atmospheric or near-atmospheric inflating pressures, comprising:

a. an air impervious envelope made of a substantially non-stretchable, flexible material and comprising top and bottom sheets joined to one another at the perimeter portions thereof,

b. an inflating valve mounted to said envelope,

c. a resilient, open-cell foam core positioned within said envelope, said core having a planar configuration with upper and lower foam surfaces and having length and width dimensions substantially in excess of its thickness dimension,

d. each of said upper and lower sheets of the envelope comprising an outer fabric layer, an intermediate air impervious layer of a plastic material having a relatively high melting point, and an innermost layer of a thermoplastic material which has a relatively lower melting point and in which said foam material is imbedded to form a secure bond,

e. said foam being substantially continuous throughout said envelope and having substantially its entire upper and lower surfaces securely imbedded in the inner thermoplastic layers of, respectively, the upper and lower sheets of the envelope, with a bonding strength adequate to resist tension loads imparted by internal air pressure resulting from compression loading on the mattress,

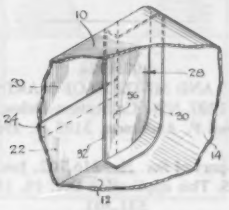
whereby the foam core is able to act effectively in tension between said upper and lower sheets to limit expansion of said upper and lower sheets from each other to an extent that sufficient air pressure is maintained in exteriorly loaded areas of the mattress to provide adequate support, with said intermediate layer of the two sheets providing an air impervious barrier to maintain such air pressure, and with the outer fabric layer acting as a protective layer for the air impervious intermediate layer.

4,025,975

WATER BED MATTRESS

Raymond M. Phillips, 305 Poquito Lane, Topanga, Calif. 90290, and William J. Pease, 818 W. Beach Ave., Inglewood, Calif. 90302

Filed Dec. 1, 1975, Ser. No. 636,695
Int. Cl.² A47C 27/08
U.S. Cl. 5—370 23 Claims



1. A generally orthogonally shaped water bed mattress comprising:

a. an upper sheet of flexible foldable plastic material;

b. a lower sheet of flexible foldable plastic material and being in spaced apart relationship to said upper sheet;

c. side wall means extended between said upper and lower sheets forming a plurality of side wall sections which are connected at end margins to form a peripheral side wall;

d. means forming an aperture in at least a first of said side wall sections adjacent an end margin where said first side wall section is ultimately connected to an end margin of a second of said side wall sections in angular relationship thereto, said aperture resulting from a portion of the material forming said first side wall section being cut-out, a substantial portion of the end margin of said first side wall section being spaced from the end margin of said second side wall section as a result of said aperture; and,

e. a panel sealed at least to said first side wall section around the periphery of said aperture to thereby completely cover said aperture and form a watertight chamber between said upper and lower sheets and said peripheral side wall, said panel enabling complete connection of the end margins of said first and second side wall sections, thereby forming a corner margin without substantial pleating.

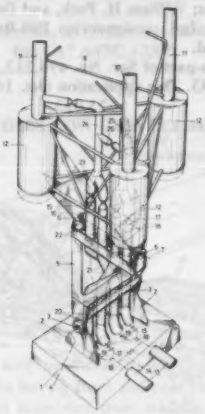
4,025,976

SUBMARINE PIVOTING STRUCTURE WITH DUCTING

Arie van der Landen, Zwijndrecht, Netherlands, assignor to Ingenieursbureau Marcon (Marine Consultants) B. V., The Hague; Koninklijke Fabrieken Penn & Baudin B. V., Dordrecht and Vredestein Loosduinen B. V., The Hague, all of, Netherlands

Filed Feb. 17, 1976, Ser. No. 658,937
Claims priority, application Netherlands, Feb. 17, 1975, 7501851
Int. Cl.² B63B 21/52
U.S. Cl. 9—8 P 6 Claims

1. In a submarine pivot structure for connecting two structures for pivoting relative to each other in plural directions and having a plurality of fluid transport ducts extending between said two structures, the improvement wherein: said pivoting structure comprises means defining two pivot axes which are perpendicular to each other and are spaced from each other at some distance, said plural ducts at each pivot axis extend in a plane passing through one of said axes in side by side position and being perpendicular to the other pivot axis and being positioned substantially perpendicular to said one pivot axis, and said ducts extending as throughgoing separate structural units through both pivot axes and said ducts



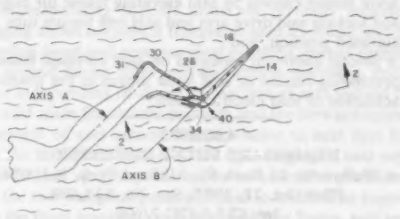
each including a short inclined connection duct portion between said axes.

4,025,977

ANGULAR FOOT FIN

John J. Cronin, El Toro, Calif., assignor to U. S. Divers Co., Santa Ana, Calif.

Filed Sept. 12, 1975, Ser. No. 612,677
Int. Cl.² A63B 31/10
U.S. Cl. 9—309 3 Claims



1. A swimming fin comprising:

A foot receiving portion having a blade extending therefrom in a manner whereby the blade can be oriented into a semi-rigid extended position at an attitude of being substantially in the same axis as the general axial direction of a user's leg during swimming movements to the extent of the inherent resiliency of the material forming the fin and wherein said blade extends laterally outwardly in a direction away from the foot receiving portion; and,

means for orienting said blade from an axis substantially in parallel relationship to a user's leg into an axis substantially parallel to a user's sole of the foot to enable a user to walk with the fin when the user is not using the fin in a swimming mode.

4,025,978

FEEDING DEVICE FOR MULTI-HEADED RADIAL TYPE NUT TAPPERS

Yuan Ho Lee, 85, Jen Ho Road, Tainan, China /Taiwan

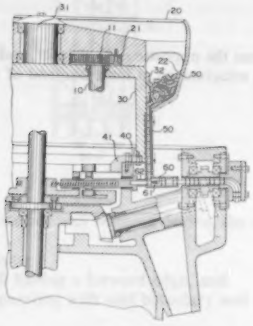
Filed Mar. 3, 1976, Ser. No. 663,504
Int. Cl.² B23G 1/20, 11/00
U.S. Cl. 10—130 WH 3 Claims

1. A feeding device for a multiheaded radial type nut tapper

which includes tapping guideways for continuously receiving nut blanks, said feeding device comprising:

a stationary drum member secured by suitable means to the body of a nut tapper, said drum member defining a plurality of guide grooves thereon extending substantially along the length of the drum member for guiding nut blanks therealong when properly aligned therewith;

a rotary hopper member coaxially and rotatably connected to an upper portion of said drum member and structurally cooperating with said drum member for continuously moving, when rotating, nut blanks into said guide grooves of said drum member;



means for driving said hopper member in a continuous rotary motion about its axis to distribute nut blanks into alignment with the guide grooves of said drum member in such a manner that, at every rotation of said hopper member about its axis, a plurality of nut blanks will be introduced into a plurality of said guide grooves on the drum to feed each nut blank to a suitable position at the front of one of a plurality of tapping guideways provided within a nut tapper to receive said nut blanks from said drum member, thereby to feed nut blanks to said nut tapper in a continuous manner.

4,025,979

APPARATUS FOR CLEANING THE SEALING SURFACES OF COKE OVEN DOORS AND DOOR JAMBS

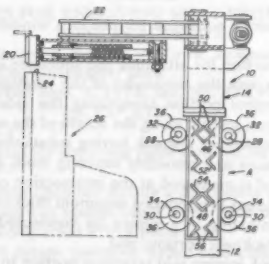
Walter Stanke, and Gottfried Mertens, both of Essen, Germany, assignors to Heinrich Koppers Gesellschaft mit beschrankter Haftung, Essen, Germany

Division of Ser. No. 501,298, Aug. 28, 1974, Pat. No. 3,971,092. This application Apr. 5, 1976, Ser. No. 673,985

Claims priority, application Germany, Sept. 7, 1973, 2345212

Int. Cl.² C10B *43/04*

U.S. Cl. 15—93 A **3 Claims**



1. Apparatus for cleaning the sealing surfaces of coke oven door jambs which includes,

a frame member secured to a supporting frame,

a second frame member mounted on said first frame member and arranged to move vertically relative thereto,

cleaning tools secured to said second frame member and extending forwardly therefom, said cleaning tools arranged to clean the vertical sealing surfaces of coke oven door jambs,

tool holders secured to said second frame member,

second cleaning tools arranged to move vertically with said second frame member and clean the inner surface of the coke oven chamber adjacent the coke oven door jamb, and

means to move said tool holders inwardly and outwardly relative to said second frame member so that said tools are arranged to clean the inside surface of coke oven chambers having different transverse dimensions.

4,025,980

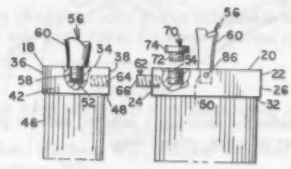
SECTIONAL PAINT BRUSH

Thomas J. Neil, 14 Everett St., Dorchester, Mass. 02122

Filed May 24, 1976, Ser. No. 689,258

Int. Cl.² A46B *7/04*

U.S. Cl. 15—202 **10 Claims**



1. A paint brush comprising:

a. a pair of brush sections usable separately, or in combination with each other in parallel side-by-side relation, each brush section including:

i. a body portion having a top end;

ii. vertically extending side wall portions having plane abutting surfaces;

iii. vertically extending front and rear wall portions;

iv. a plurality of bristles extending from the bottom of each body portion;

v. a centrally disposed threaded socket on the top end of each body portion for use when the brush section is used separately; and

vi. a threaded socket on the top end of one of the sections centrally disposed with respect to the combined width of the pair of assembled brushes when coupled together,

b. separable coupling means associated with each brush section for detachable connection of each body portion to each other for forming an assembled rectangular brush, said separable coupling means including:

i. an internally threaded opening on each of the adjacent side wall portions; and

ii. a corresponding threaded element receivable in each of the threaded openings such that the ends of the bristles are in horizontal alignment and the vertically extending side wall portions are abutting each other,

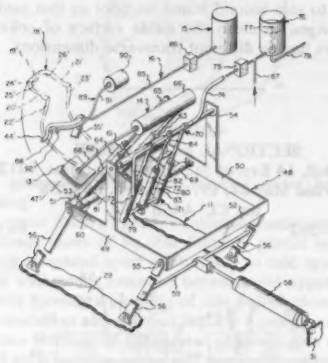
c. a removable handle adapted to be employed with the assembled sections or each section separately, said handle having a threaded shank receivable in each of the centrally disposed sockets on the top end of each body portion such that the user may connect the handle at the center of the either brush section when used separately or in the socket centrally disposed when the brush sections are used in assembled relation,

d. closure means adapted to be disposed across the open sockets when the assembled brush is in use to prevent paint from entering therein.

4,025,981
APPARATUS FOR, AND METHOD OF, CLEANING A SELECTED SURFACE PORTION OF THE INTERIOR LINER OF A TIRE

Glenn M. Root, Snyder; Ronald G. Root, Glenwood, and Richard A. Root, Williamsville, all of N.Y., assignors to G.M. Root, Inc., Buffalo, N.Y.

Filed Oct. 30, 1975, Ser. No. 627,080
Int. Cl.² A46B *13/04*; B05C *11/00*; B05B *13/06*; B08B *3/00*
U.S. Cl. 15—21 R 8 Claims



1. Apparatus for cleaning a selected surface portion of the interior liner of a tire, comprising:

a frame;

first holding means mounted on said frame and selectively operable to hold said tire immovable at a desired angular position and to spread the beads of said tire proximate said selected surface portion to be cleaned;

a brush;

brush moving means mounted on said frame and selectively operable to bring said brush into engagement with said selected surface portion and to move said brush relative to said selected surface portion while so engaged to scrub said selected surface portion;

a source of cleaning solvent;

supplying means selectively operable to withdraw solvent from said source and to supply such withdrawn solvent to said selected surface portion;

a drain conduit having an open end;

drain conduit moving means mounted on said frame and selectively operable to move said drain conduit to engage the bottom of said liner;

a reversible pump operatively arranged in said drain conduit and adapted to pump solvent appearing at said conduit open end through said drain conduit;

accumulator means operatively associated with said drain conduit to receive solvent pumped by said pump and adapted to store a fractional portion of such pumped solvent;

whereby the operation of said pump may be reversed to flood said liner through said drain conduit with solvent retained in said accumulator means.

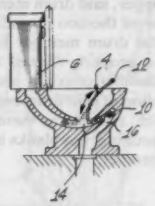
4,025,982
CLEANING DEVICE

Ray L. Palmer, 3951 Conning St., Riverside, Calif. 92509

Filed June 16, 1976, Ser. No. 696,810
Int. Cl.² A46B *15/00*
U.S. Cl. 15—106 12 Claims

1. A cleaning device for cleaning plumbing fixtures and particularly adapted for reaching around bends and traps in remote passageways therein, comprising:

an elongated stem formed of a flexible plastic material, said stem having a plurality of spaced ball-like enlargements integrally formed substantially along its entire length

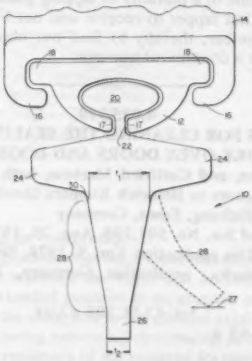


between the opposite ends thereof, and adapted to have a brush attached on at least one end of said stem.

4,025,983
WINDSHIELD WIPER SQUEEGEE

Paul D. Schlegel, Boulder, Colo., assignor to The Gates Rubber Company, Denver, Colo.

Filed Sept. 2, 1975, Ser. No. 609,275
Int. Cl.² B60S *1/38*
U.S. Cl. 15—250.36 1 Claim



1. An elastomeric squeegee for use in a windshield wiper, comprising:

a retention portion for attaching the squeegee in operative association with the remainder of the windshield wiper;

a wiping element portion comprising the side flanges of uniform cross section along the length of the squeegee, to which is connected a shank having substantially straight sided surfaces and smoothly tapering from a maximum thickness of t_1 measured at the intersection of the shank with the flanges to a reduced minimum thickness of t_2, the shank terminating in a wiping lip connected to its said reduced thickness portion; and

a reduced neck joining said retention portion to said wiping portion;

said shank taper being determined by a taper coefficient k of substantially 0.6., but not to exceed 0.6, wherein $k = t_1 - t_2/t_1$.

4,025,984

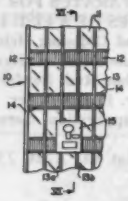
WINDOW WALL WASHING DEVICE FOR HIGH RISE BUILDINGS

Ralph H. Hoener, Jr., University City, Mo., assignor to H. H. Robertson Company, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 229,846, Feb. 28, 1972, abandoned, which is a continuation-in-part of Ser. No. 130,616, April 2, 1971, abandoned. This application July 31, 1973, Ser. No. 384,284

Int. Cl.[2] A47L 1/04

U.S. Cl. 15—302 37 Claims



1. In a building exterior wall washing device, the combination of

a housing comprising

a boundary wall having a forward edge, and

a rear wall cooperating with said boundary wall to define a chamber;

a sight disposed in an essentially vertical plane defined by the said housing and being essentially unobstructed at the said forward edge of said housing;

liquid distributing means within said chamber for directing liquid through the said sight;

plural spaced-apart specing members located exteriorly of said housing maintaining the said housing in spaced-apart relation from the said exterior wall;

means for providing a high velocity in-rushing gas curtain at the said forward edge of the said housing to preclude substantial egress of said liquid between the said forward edge and the said exterior wall;

means communicating with said chamber at a location spaced from said forward edge for removing liquid from said chamber;

conduit means for extracting at least a portion of the said gas from the said chamber;

said means for providing a high velocity in-rushing gas curtain comprising fan means connected to the said conduit means for evacuating the said chamber whereby atmospheric air is forceably drawn between the said forward edge of the said housing and the said exterior wall, into the said chamber as the said high velocity in-rushing gas curtain.

4,025,985

APPARATUS FOR REMOVING MEAT FROM TRIMMED BONE FRAGMENTS

Roy Settle Rousseau, Bettendorf, Iowa, assignor to The Kartridg Pak Co., Davenport, Iowa

Filed Sept. 3, 1974, Ser. No. 502,977

Int. Cl.[2] A22C 7/00

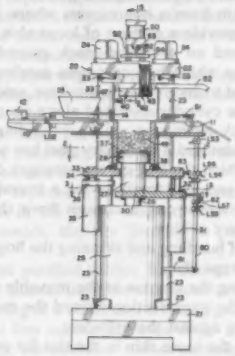
U.S. Cl. 17—1 G 36 Claims

36. Apparatus for removing meat from bones comprising in combination:

a compression chamber having a disruptible normally rigid foraminous wall against which a charge of bone fragments may be compacted into a press cake;

compaction means operable within said chamber to compact charges of bone fragments into press cake against said foraminous wall while meat adhering to said bone fragments is removed therefrom and extruded through the foramina in said wall; and

means for periodically disrupting said foraminous wall and enlarging the foramina therein, thereby allowing release



therefrom of residual solid matter retained in said foramina when said press cakes are removed from said wall.

4,025,986

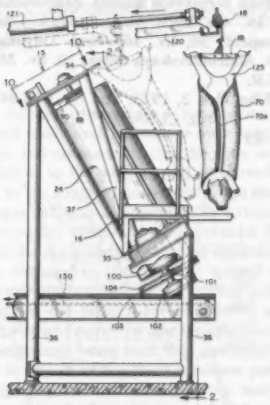
APPARATUS AND METHOD FOR SKINNING ANIMAL CARCASSES

Ernest E. Koken, Madison, Wis., assignor to Oscar Mayer & Co. Inc., Madison, Wis.

Filed Jan. 26, 1976, Ser. No. 652,050

Int. Cl.[2] A22B 5/16

U.S. Cl. 17—21 16 Claims



1. A skinning machine comprising,

an elongated cylinder rotatably mounted along an inclined axis and having an axially extending slot,

powered retarding means connected to the cylinder for continually retarding rotation of the cylinder,

a skin clamp along the slot for clamping a portion of the animal skin longitudinally of the carcass,

an elongated stationary peel bar arranged along the cylinder and parallel to the outer surface thereof and spaced therefrom about the thickness of the skin for engaging the animal carcass during the skinning thereof,

means connected to the clamp coacting with the retarding means to first drive the clamp to closed skin-clamping position and thereafter to effectively connect the clamp

to the cylinder and rotatably drive the cylinder relative the peel bar to remove the skin from the carcass,

and brake means energized when the driving means is at rest for preventing rotation of the cylinder.

15. In a system for skinning a hog which includes a machine for peeling skin from a hog carcass where the hog has been prepared to provide a portion of loose skin longitudinally of the carcass and an overhead track extending adjacent the machine along which hog carcasses gambrelled by the hind legs are moved to and from the machine, said machine including a rotatable cylinder mounted along an axis inclined away from the track having an axially extending slot and a skin clamp at the slot and a stationary peel bar adjacent the cylinder against which the hog carcass engages during rotation of the cylinder, and said track having a movable section at the machine for transferring a carcass from the track run to a position at the machine,

a method of handling and skinning the hog carcass comprising the steps of:

positioning the carcass at the movable track section,

moving the track section toward the machine to position the hog against the cylinder,

inserting the loose skin in the slot for engagement by the clamp,

closing the clamp to connect the skin to the cylinder,

rotating the cylinder to drive the carcass against the peel bar and peel the skin from the carcass,

moving the track section back to the track run thereby moving the carcass away from the machine,

unclamping the skin to allow it to fall away from the cylinder,

and returning the cylinder to the home position for the next successive skinning operation.

4,025,987

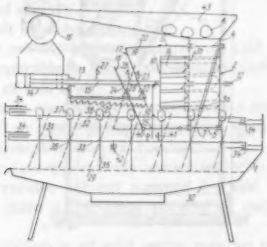
APPARATUS FOR RECOVERING BILE FROM GALL BLADDERS OF SLAUGHTERED BEASTS

Leonid Leonidovich Bortkevich, Polyarnaya ulitsa, 40, kv. 9; Alexandr Georgievich Burmistrov, ulitsa Yablochkova, 23, kv. 39; Nikolai Sergeevich Karnet, Zelenodolskaya ulitsa, 9, korpus 5, kv. 46; Boris Alexandrovich Sevostyanov, Leninsky prospekt, 36, kv. 165, and Tatyana Grigorievna Filatova, B. Andronievskaya ulitsa, 20, kv. 359, all of Moscow, U.S.S.R.

Filed Oct. 2, 1975, Ser. No. 618,967

Int. Cl.² A22C *17/14*

U.S. Cl. 17—43 **10 Claims**



1. In an apparatus for recovering bile from gall bladders, upright wall means defining a chamber having an upper inlet port and a lower output port smaller than said upper inlet port, said upright wall means including at least a pair of opposed wall portions which converge downwardly from said upper inlet port to said lower outlet port, and said upright wall means being formed with slots passing therethrough, a plurality of knives situated in alignment with said slots for extending therethrough into the interior of the casing and having substantially pointed ends for piercing into gall bladders which enter into the casing through said upper inlet thereof and which progress downwardly through the casing to move out of the latter through said lower outlet thereof, carriage means carrying said knives, guide means guiding said carriage means for reciprocating movement so that said knives will reciprocate through said slots for piercing through gall bladders in said casing, drive means operatively connected with said carriage means for reciprocating the latter, and means situated beneath said outlet port for receiving the pierced gall bladders which pass through said outlet port.

4,025,988

METHOD AND APPARATUS FOR CONTROLLING THE TOOLS AND GUIDES OF A FISH DRESSING MACHINE

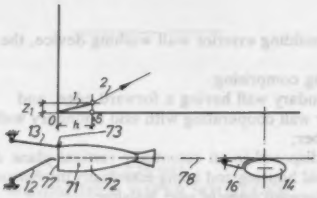
Franz Hartmann, Bad Oldesloe; Heinrich Lück, and Holger Gölnitz, both of Lubeck, all of Germany, assignors to Nordischer Maschinenbau Rud. Baader, Lubeck, Germany

Filed Mar. 11, 1976, Ser. No. 666,145

Claims priority, application Germany, Mar. 11, 1975, 2510421

Int. Cl.² A22C *25/16*

U.S. Cl. 17—52 **9 Claims**



1. A method for controlling the operation of tools and guides on fish dressing machines, including the steps of:

conveying a fish in the direction of its longitudinal axis at a constant speed toward at least one tool,

detecting a first body location on said fish as said body location reaches a designated point along the path of travel of said fish,

initiating the counting of pulses of a first frequency in response to the detection of said first body location,

detecting a second body location on said fish as said second body location reaches a designated point along the path of travel of said fish,

terminating the counting of pulses of said first frequency and initiating the counting of pulses of a second frequency in response to said detection of said second body location,

adding the pulses of said second frequency to the pulses of said first frequency until the pulses counted reaches a preselected total number of pulses,

and sending a signal to a tool control element for operating said tool to cut said fish at the moment that said preselected total number of pulses has been counted.

4,025,989

OPENING AND CLEANING MACHINE FOR FIBROUS MATERIAL, ESPECIALLY COTTON

Bill J. Naarding, Hengelo, Netherlands, and Herbert Hergeth, Dulmen, Germany, assignors to Hergeth KG Maschinenfabrik und Apparatebau, Dulmen, Germany

Filed Dec. 30, 1975, Ser. No. 645,402

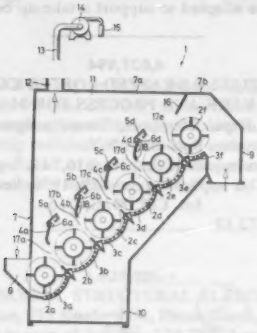
Claims priority, application Germany, Apr. 11, 1975, 2515780; Sept. 17, 1975, 2541380

Int. Cl.² D02J *7/00*

U.S. Cl. 19—93 **9 Claims**

1. An opening and cleaning machine for fibrous material comprising means defining a housing, a plurality of rotatable beater units disposed within said housing, said beater units being in spaced relationship to each other and defining gaps

between each adjacent pair of beater units, grating means disposed generally adjacent to and beneath said beater units, guide plate means disposed generally adjacent to and above said beater units, said guide plate means being in spaced relationship to each other and defining gaps between each adjacent pair of guide plate means, first aperture means in said housing adjacent a first of said beater units through which fibrous material is introduced into said housing for processing, second aperture means in said housing adjacent a last of said beater units through which air is drawn into said housing and through which processed fibrous material is discharged from said housing, third aperture means in said housing opening into a space above said guide plate means, means for creating



suction in said space through said third aperture means for removing dust from said fibrous material during the processing thereof and discharging the removed dust from said space through said third aperture means, said housing includes a generally horizontal top wall, said third aperture means is in said top wall, and said beater units are disposed in an inclined fashion between said first and second aperture means, and adjacent pairs of said guide plate means gaps and said beater unit gaps are generally in alignment in a plane generally transverse to said grating means whereby the suction created in said space draws dust from said fibrous material through said gap and generally upwardly between all adjacent pairs of said guide plate means.

4,025,990

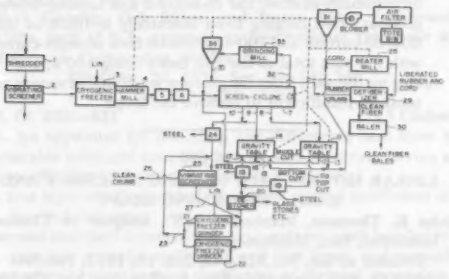
PROCESS FOR RECLAIMING RUBBER, METAL AND FABRIC FROM WHOLE TIRES

Norris G. Lovette, Jr., Breinigsville, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.

Continuation-in-part of Ser. No. 605,029, Aug. 15, 1975, abandoned. This application Apr. 28, 1976, Ser. No. 681,016

Int. Cl.[2] B02C *21/00*

U.S. Cl. 241—14 **9 Claims**



1. A process for the recovery of components in tire scrap having magnetic components and non-magnetic cord and rubber components combined therein comprising the steps of:

a. cooling the tire scrap in a first freezing zone to the embrittlement temperature;

b. comminuting the cooled scrap in a first comminution zone to effect a first size reduction thereof;

c. magnetically separating the discharge from the first comminuting zone into a magnetic fraction and a substantially non-magnetic rubber and cord fraction containing residual magnetic components;

d. separating the non-magnetic rubber and cord fraction in a first separating zone into at least a fine stream, an intermediate stream and a coarse stream;

e. subjecting at least the intermediate stream to density separation by pneumatic fluidization for forming at least a light fraction and a heavy fraction;

f. magnetically separating the residual magnetic components present in the heavy fraction from the non-magnetic components, thereby forming a purified rubber fraction;

g. subjecting the purified rubber fraction to a second size reduction by substantially simultaneous cryogenic freezing and grinding in a combined freezing-grinding zone to form purified fine rubber particles; and

h. separating the purified fine rubber particles in a second separation zone to form crumb having a particle size of about 1/20 of an inch or less and a coarse fraction and recovering the crumb as product.

4,025,991

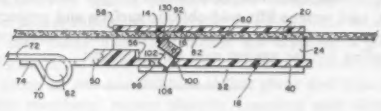
BELT BUCKLE

Charles M. Miner, 2807 S. Millwood, Wichita, Kans. 67217

Filed Nov. 20, 1975, Ser. No. 633,911

Int. Cl.[2] A44B *11/12*

U.S. Cl. 24—191 **1 Claim**



1. A belt buckle comprising a longitudinally extending channel-shaped shell that includes a web joining a pair of flanges, a slide and means mounting the slide within the shell in spaced relation to the web for sliding movement substantially parallel to the longitudinal extent of the shell, said slide, web and flanges defining a longitudinally extending space of generally rectangular transverse configuration for commodiously accommodating insertion of a belt therethrough, a gripping member disposed in said space in spaced relation from the web, said gripping member being eccentrically and pivotally connected to the flanges for oscillation about an axis parallel to the web and normal to the longitudinal extent of the shell, the arrangement being such that oscillation of the gripping member in one direction from a release position thereof reduces the spacing between the gripping member and the web in an arrangement adapted to grip a belt between the web and the gripping member, means operatively interconnecting the slide and the gripping member for oscillating the gripping member in said one direction and in the opposite direction respectively in response to the slide moving in first and second opposite directions relative to the shell, said interconnecting means comprising a slot in said slide and a tongue on said gripping member, said tongue radially extending from the axis of the pivotal mounting of gripping member, said tongue being of a generally rectangular transverse configuration and having its major dimension parallel to said axis, and said tongue having an extension along one side thereof with such extension having a pair of ears at its extremity that extend in opposite directions toward said flanges, and said slot receiving said tongue and being of a "T"-shape in an arrangement such that

the ears can engage the slide on a side thereof opposite the web.

4,025,992

DEVICE FOR SAFETY BELTS FOR VEHICLES

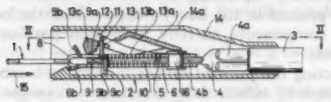
Oskar Lennart Lindblad, Hedasgatan 16, 440 20 Vargarda, Sweden

Filed Jan. 8, 1976, Ser. No. 647,517

Claims priority, application Sweden, Jan. 10, 1975, 7500248

Int. Cl.² A44B *11/26*

U.S. Cl. 24—230 AL **10 Claims**



1. A receiving part for the coupling tongue of a safety belt for vehicles, comprising: spaced guide means for receiving said tongue therebetween, locking means for locking said tongue within said guide means when said tongue is received therebetween, said locking means being movable in said receiving part in a direction transverse to said guide means and to the direction of insertion of said tongue into said receiving part, a lever-shaped lifting element located in said receiving part and cooperating with, but being separate from, said locking means, spring means pressing said locking means against said lifting element, said lifting element having a projection with an oblique surface located in the path of insertion of said coupling tongue in front of said locking means when looking in the direction of insertion of said tongue into said receiving part, so that upon insertion of said tongue into said receiving part, said tongue lifts said oblique surface and projection and thereby said locking means out of the path of insertion of said coupling tongue against said spring means.

4,025,993

METHOD OF, AND APPARATUS FOR SIZING AND DRYING WARPS

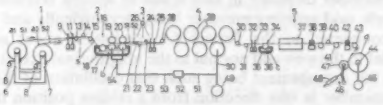
Susumu Kuroda, Nagoya, Japan, assignor to Kawamoto Industrial Co., Limited, Nagoya, Japan

Filed Mar. 24, 1976, Ser. No. 669,891

Claims priority, application Japan, Apr. 12, 1975, 50-44391

Int. Cl.² D06C *29/00*

U.S. Cl. 28—28 **11 Claims**



2. An apparatus for sizing and drying warps, comprising:

a beam stand section;

a sizing section;

a defluffing section;

a drying section; and

a winding section, said beam stand, sizing, defluffing, drying and winding sections being disposed successively in this order in the direction of travel of said warps through said apparatus;

said beam stand section including at least one beam stand adapted to support a warp beam thereon;

said sizing section including yarn aligning means for arranging at intervals of at least 1.3 mm a large number of spun yarns withdrawn from said warp beam and lying in spaced relationship in a plane, and a sizing unit provided with means for squeezing said yarns at least twice;

said defluffing section including at least a pair of defluffing rods adapted for rubbing against diametrically opposite surfaces of said yarns, yarn aligning means for maintaining said intervals of at least 1.3 mm and means provided above said defluffing rods and said last mentioned yarn aligning means for spraying water or a weak solution of size thereagainst;

said drying section including a plurality of appropriately heated drying cylinders around which said yarns are passed to be thereby dried after they are defluffed;

said winding section including yarn aligning means for maintaining said intervals of at least 1.3 mm and a winding device adapted to support a take-up beam thereon.

4,025,994

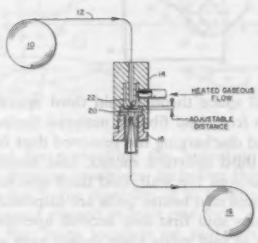
DIFFERENTIALLY DRAFTED LOFTED CONTINUOUS FILAMENT YARN AND PROCESS FOR MAKING SAME

Bobby M. Phillips, Kingsport, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 616,744, Sept. 25, 1975, abandoned. This application July 29, 1976, Ser. No. 709,681

Int. Cl.² D02G *1/16*

U.S. Cl. 28—72.12 **5 Claims**



1. Process for producing a draw-lofted yarn, the process comprising:

feeding from a source of supply to and through a gaseous jet device having co-current and counter-current gaseous flows a single end of undrawn or partially drawn continuous filament yarn.

heating the filament yarn while in the jet device to a predetermined temperature above the glass transition temperature by the co-current and counter-current gaseous flows,

differentially drafting the filmant yarn in the jet device by drag forces induced by the heated co-current and counter-current gaseous flows and thereby form in the filaments at random intervals along the lengths of the individual filaments coils, loops or whorls in those portions of the yarn that are drafted more than the other portions so differentially drafted, the co-current and counter-current gaseous flows ranging from essentially 0–100% of total flow co-current and 100–0% of total flow counter-current with the sum total of the two flows being 100%, and

taking up the yarn from the gaseous jet device at speeds and tensions insufficient to remove the loops.

4,025,995

LINEAR MOTION BALL BEARING ASSEMBLY AND BALL CONFORMING SHAFT

John B. Thomson, Manhasset, N.Y., assignor to Thomson Industries, Inc., Manhasset, N.Y.

Division of Ser. No. 325,042, Jan. 19, 1973, Pat. No. 3,900,233. This application June 5, 1974, Ser. No. 476,691

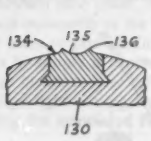
Int. Cl.² B21D *53/10*; B21K *1/04*

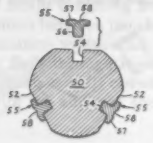
U.S. Cl. 29—148.4 R **4 Claims**

1. A method of forming a shaft with at least one hardened

metal, axially extending groove on the surface thereof, comprising the steps of:

forming an axially extending, generally rectangular slot with longitudinally extending undercut portions adjacent the bottom thereof in the surface of said shaft, forming an elongated strip member from a heat-treatably, hardenable material having an axially extending groove on one surface thereof and another portion thereof having a shape corresponding to that of said slot,





fitting said strip member into said slot, and pressure rolling said strip member to the size of said slot to thereby lock said strip member within said slot.

4,025,996

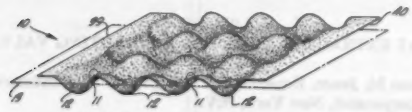
SINUSOIDAL STRUCTURAL ELEMENT

David R. Saveker, 711 Hanford St., Pismo Beach, Calif. 93449

Continuation-in-part of Ser. No. 170,789, Aug. 11, 1971, abandoned. This application Mar. 18, 1974, Ser. No. 452,127

Int. Cl.² B21D *13/00*

U.S. Cl. 428—594 **8 Claims**



1. As a self-supporting structural element, an integral sheet of material having a modulus of elasticity greater than 10^8 pounds per square inch characterized by alternating elevations and depressions three-dimensionally sinusoidally variant about a two-dimensional or non-euclidean surface of neutrality, the surfaces of said sheet being curvilinearly continuous in passing from the peaks of said elevations through said surface of neutrality to the floors of adjoining depressions.

4,025,997

CERAMIC MOUNTING AND HEAT SINK DEVICE

Jeffrey Gernitis, Oak Ridge, and Bruno Butti, Englewood Cliffs, both of N.J., assignors to International Telephone & Telegraph Corporation, Nutley, N.J.

Filed Dec. 23, 1975, Ser. No. 643,740

Int. Cl.² B32B *15/04*

U.S. Cl. 428—621 **13 Claims**

1. An apparatus for mounting and dissipating heat from a fracturable substrate coupled thereto, said substrate having a first coefficient of thermal expansion comprising:

a first layer of a first material having a second coefficient of thermal expansion; and

second and third layers of a second material each bonded to an outer opposite surface of said first layer, said second material having a third coefficient of thermal expansion, said first coefficient of thermal expansion intermediate that of said second and third coefficients of thermal expansion.

4,025,998

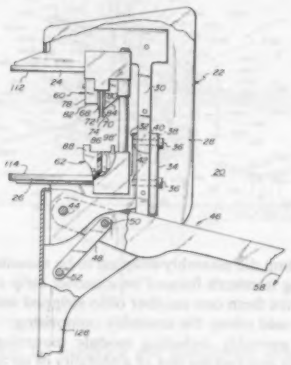
WIRE SLITTING AND INSTALLING APPARATUS

Daniel Eppler, Old Bridge, N.J., assignor to Thomas & Betts Corporation, Elizabeth, N.J.

Filed Feb. 3, 1976, Ser. No. 654,895

Int. Cl.² H01T *43/00*, *43/04*

U.S. Cl. 29—566.4 **27 Claims**

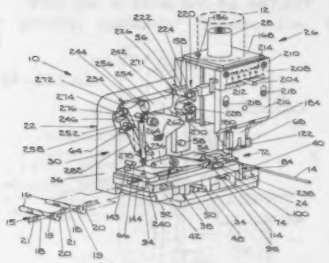


1. Apparatus for slitting the insulating sheath of a sheated three-conductor cable having two outer conductors and a central conductor comprising: a slitting assembly including a pair of selectively spaced parallel blade members lying in respective planes substantially parallel to a first plane located between said blade members; means for cradling a given length of a sheathed three-conductor cable in a predetermined position along an axis parallel to said first plane and adjacent said blade members; means slidably coupling said slitting assembly to said cradling means for guiding said slitting assembly towards and away from said cradling means in relative linear movement along an axis substantially perpendicular to the axis of each given length of sheathed three-conductor cable; and means operatively coupled to said slitting assembly and said cradling means for moving said slitting assembly and said cradling means towards and away from one another; said slitting assembly including a first shoulder portion adjacent one of said blade members and a second shoulder portion adjacent the other of said blade members, said first shoulder portion having a bearing surface oriented substantially perpendicular to the planes of said blade members for displacing one of such outer conductors of such three-conductors cable in a direction out of the plane of such three-conductor cable upon the relative movement of said slitting assembly and said cradling means towards one another and the slitting of the sheath covering such three-conductor cable, said second shoulder portion having a bearing surface oriented at an oblique angle to the planes of said blade members for displacing the other of such outer conductors away from such central conductor in the plane of such three-conductor cable simultaneously with the displacement of the first mentioned outer conductor and the slitting of the sheath covering such three conductor cable; said cradling means including an anvil portion for supporting the central conductor of such three-conductor cable during such slitting operation, there being an elongate recessed portion extending along the length of and adjacent to said anvil portion for receiving the outer conductor which is displaced out of the plane of such three-conductor cable by said bearing surface of said first shoulder portion.

4,025,999
ADJUSTABLE CRIMP DIE ASSEMBLY

Joseph Wolyn, 7526 Woodland Terrace, Gurnee, Ill. 60031, and Arthur J. Johnson, 324 Tupelo, Naperville, Ill. 60540

Filed Feb. 18, 1976, Ser. No. 659,001
Int. Cl.² H01R 43/04
U.S. Cl. 29—753 11 Claims



1. In a crimp die assembly adapted to be mounted in a press for crimping terminals formed on a carrier strip and spaced a given distance from one another onto stripped insulation clad wire leads, said crimp die assembly comprising:

a frame assembly including module mounting means for locating and locking one of a plurality of terminal module assemblies onto said frame assembly;

one of a plurality of different integral terminal module assemblies removably mounted on said base, each terminal module assembly having a crimp station whereat a terminal is crimped onto a wire lead, said crimp station including an insulation anvil and a conductor anvil, a different crimp station adapted to crimp a different styled terminal;

a punch assembly slidably mounted on the frame assembly facing said crimp station and operably connected to the press for reciprocal movement toward and away from said crimp station, said punch assembly including an insulation punch and a conductor punch adapted to engage a wire lead and terminal at the crimp station; and

an adjustable terminal feed assembly associated between said punch assembly and said terminal strip for feeding the strip of terminals one at a time to the crimp station in response to the movement of the punch assembly.

4,026,000
APPARATUS FOR PRODUCING ENVELOPED BATTERY PLATES

Kenneth Arnold Anderson, Milwaukee, Wis., assignor to Globe-Union Inc., Milwaukee, Wis.

Filed July 15, 1976, Ser. No. 705,537
Int. Cl.² H01M 2/14
U.S. Cl. 29—730 12 Claims

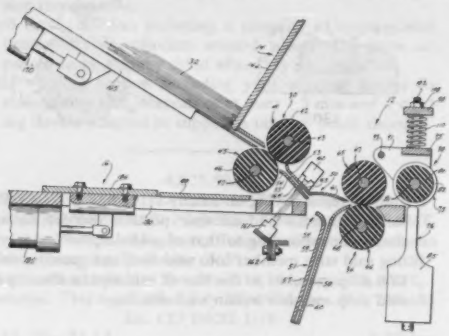
1. Apparatus for enveloping battery plates in heat sealable separators, said apparatus comprising:

separator dispensing means for sequentially dispensing separators from a stack of heat sealable separator sheets;

first roller means supported adjacent said separator dispensing means for receiving said separators from said dispensing means and directing them away from said dispensing means,

folding means supported adjacent said first roller means for receiving said separators from said first roller means and folding said separators, said folding means comprising first guide means for guiding said spearators along a first path of movement, second guide means spaced from said first guide means for receiving said separators from said first guide means and guiding said separators along a second path of movement angularly displaced from said first path, stop means for limiting the travel of said separators in said second guide means to cause said separators to buckle forming a buckled portion in said separators, and second roller means for receiving the buckled portion of said separators and for folding said separators and directing them away from said folding means;

plate dispenser means disposed ahead of said folding means for directing battery plates edgewise into said folding means and between the folded portions of said separators



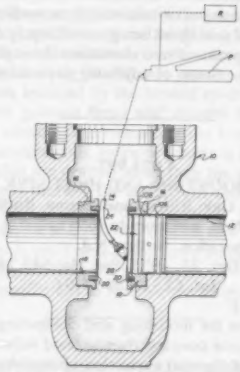
and into said second roller means whereby said separators are folded against opposite sides of said battery plates; and

ultrasonic sealing means for receiving said folded separators and enclosed battery plates from said second roller means and for heat sealing at least the edges of said separators adjacent the fold line of said separators to from an envelope.

4,026,001
SEAT EXTRACTOR TOOL FOR EXTRACTING VALVE SEATS

Thomas M. Jones, Houston, Tex., assignor to ACF Industries, Incorporated, New York, N.Y.

Filed Dec. 31, 1975, Ser. No. 645,859
Int. Cl.² B23P 19/04
U.S. Cl. 29—213 E 3 Claims



1. A tool for extracting press-fitted seats from annular seat recesses of a valve body having flow passages, comprising a generally cylindrical body structure having a pair of spaced end caps adapted to fit within a flow passage, said end caps each having an outer peripheral surface and a flange extending outwardly from the adjacent peripheral surface, means

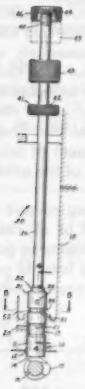
adjustably connecting the spaced end caps for longitudinal movement relative to each other, an annular retainer positioned about the body structure between the flanges of the end caps and freely movable relative to the end caps, and annular elastomeric seal between the flange of each end cap and the retainer, said elastomeric seals being urged radially outwardly by said retainer upon the longitudinal movement of said end caps toward each other, fluid passage means extending from a position outwardly of the tool to a position between the elastomeric seals to provide fluid communication to the seals, and means to supply a pressurized liquid fluid through the fluid passage means to urge the elastomeric seals radially outwardly into fluid-tight sealing engagement with the adjacent surface defining the associated flow passage.

4,026,002

TOOL FOR REMOVING VALVE LIFTERS

Oscar R. Olson, Route No. 2 Box 200B, Dassel, Minn. 55325

Filed June 23, 1976, Ser. No. 698,802
Int. Cl.² B25B *27/14*
U.S. Cl. 29—280 **6 Claims**



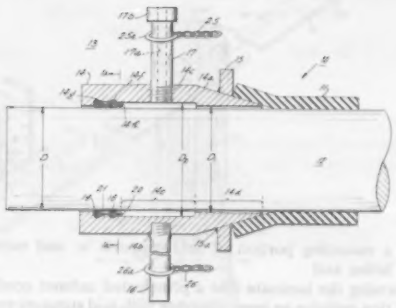
1. A valve lifter extracting tool comprising, in combination:
an outer sleeve having an in-turned lip;
a gripping assembly comprising a plurality of elements in the general form of cylindrical sectors coacting to jointly define a generally cylindrical assembly, of smaller diameter than said lip, having a first out-turned ledge at a first end and a second out-turned ledge at a second end, and having a generally conical bore tapering inwardly from said second end, said first ledge being dimensioned for passing axially out of said sleeve past said in-turned lip, and said second ledge being dimensioned for retention in said sleeve axially by said lip;
an inner sleeve having one end positioned within said outer sleeve near said second end of said assembly to limit the inward axial movement thereof in said sleeve;
an actuator passing axially through said inner sleeve and having an end configured to engage said generally conical bore for causing outward radial displacement of said elements in said outer sleeve to increase the effective diameter of said assembly;
and means for causing axial movement of said actuator in said inner sleeve.

4,026,003

METHOD AND APPARATUS FOR BREAKING AND STRIPPING HOSE FROM A MANDREL

Anthony R. Leone, Hamilton Square, N.J., and Andrew Yakim, Yardley, Pa., assignors to Acme-Hamilton Manufacturing Corporation, Trenton, N.J.

Filed Mar. 26, 1976, Ser. No. 670,699
Int. Cl.² B23D *9/02*
U.S. Cl. 29—427 **12 Claims**



1. A method for breaking and completely stripping hose from a mandrel upon which the hose was formed wherein the hose comprises an elongated solid resilient member on said mandrel which it is desired to be removed therefrom, comprising the steps of:
providing an annular shaped nozzle means having an opening adapted to receive the mandrel therethrough and having a tapered first end, and providing the opening with an interior contour conforming to and at least slightly larger than the contour of the outer surface of the mandrel;
positioning the nozzle means upon the mandrel so that the mandrel extends through said opening and continuously axially moving the nozzle means tapered edge toward the adjacent end of the hose to be stripped from the mandrel;
wedging the tapered end of the nozzle means beneath the hose so that at least a portion of the tapered end enters between the interior surface of the mandrel;
introducing air under pressure into the region between the interior surface of the nozzle means and the exterior cylindrical surface of the mandrel and providing a sliding seal at the end of the nozzle means remote from the hose so that substantially all of the air under pressure delivered to the nozzle means enters between the interior surface of the hose and the exterior surface of the mandrel to at least slightly lift the hose away from the mandrel exterior surface;
moving the nozzle means axially along the mandrel so as to push the hose therealong and thereby completely strip the hose from the mandrel.

4,026,004

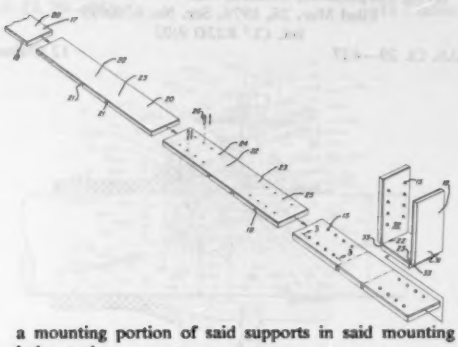
METHOD OF FORMING REFRIGERATOR LINER AND SHELF SUPPORTS

Robert Edward Fields; Charles Walter Haag, and Robert Edward Lindenschmidt, all of Evansville, Ind., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed Dec. 4, 1975, Ser. No. 637,577
Int. Cl.² B23P *3/00*, *25/00*
U.S. Cl. 29—458 **14 Claims**

1. The method of forming an insulated cabinet wall structure having an inner liner, an outer insulation, and a plurality of inwardly projecting supports, comprising the steps of:
forming a body of insulation in situ against an outer face of a liner sheet strip to define a laminate;

passing a plurality of hole-forming tools outwardly through the liner and into the insulation to form a plurality of mounting holes at preselected positions in the laminate; installing a plurality of supports in said laminate by inserting



a mounting portion of said supports in said mounting holes; and

forming the laminate into a preselected cabinet configuration defining an inner chamber with said supports projecting inwardly from the liner into said chamber.

4,026,005

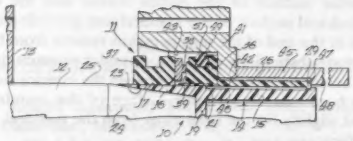
METHOD OF ASSEMBLING AND TRANSFERRING A SEAL

Richard C. Washington, Chicago Heights, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

Division of Ser. No. 505,425, Sept. 12, 1974, Pat. No. 3,947,944. This application Jan. 21, 1976, Ser. No. 650,996

Int. Cl.² B23Q *3/00*

U.S. Cl. 29—464 **4 Claims**



1. A method of assembling and transferring a seal assembly to a final operative position on a rotary shaft, comprising the steps of providing a transfer fixture consisting of a pilot and a sleeve in telescoping relationship for limited relative movement therebetween, positioning a seal stator onto the sleeve, positioning a seal rotor onto the pilot in abutting relation with the stator, positioning the transfer fixture onto the rotary shaft, the pilot having an external diameter equal to the diameter of the shaft and the sleeve having an internal diameter slightly greater than the external diameter of the pilot to slide thereover, said seal rotor frictionally engaging the pilot or the shaft, positioning a cap having a recess over the sleeve prior to the transfer operation and a hollow tool is telescoped over the sleeve and pilot to abut the cap at its forward end, and force is applied to said tool to urge the seal assembly, cap and sleeve forward relative to the pilot and push the assembled seal off of the pilot onto the shaft, said sleeve maintaining the concentricity of the seal stator relative to the shaft and seal rotor from assembly until the seal is secured in operative position.

4,026,006

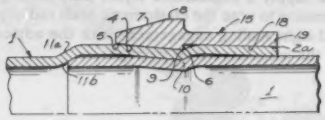
METHOD OF FORMING A TUBE JOINT

Kurt O. Moebius, P.O. Box 2625, Palos Verdes Peninsula, Calif. 90274

Division of Ser. No. 266,055, June 26, 1972, Pat. No. 3,827,727, which is a continuation of Ser. No. 876,682, Nov. 14, 1969, abandoned. This application May 28, 1974, Ser. No. 473,364

Int. Cl.² B21D *39/00*; **B23P** *11/02*

U.S. Cl. 29—508 **6 Claims**



1. The method of forming a permanently sealed joint between a circumferentially continuous normally cylindrical tubular outer member and a circumferentially continuous normally cylindrical inner member, both of which members are of a ductile material having metal-like characteristics whereby they are capable of at least some resilient recovery after being held deformed, comprising the steps of:

a. applying a radial force to one of said members throughout a first relatively narrow circumferential zone at one axial end thereof and moving said zone axially with respect to both of said members from the axial end of said one member;

b. applying successively greater radial forces throughout successive relatively narrow circumferential zones of both members and moving said successive zones of both members axially simultaneously with the first zone in following relation thereto until the forces in a final zone are sufficient to deflect and plastically deform both said members radially to produce resilient sealing contact therebetween throughout said final zone;

c. continuing axial movement of said zones until said final zone is spaced inwardly of the axial end of said one member; and

d. then stopping movement of said zones and relieving at least said one member of all radial forces in a region rearwardly of said final zone to permit said one member to resiliently recover at least in part, toward its original dimension and thereby prevent reverse movement of said zones.

4,026,007

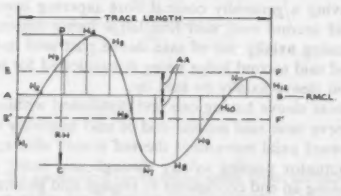
ROLL FINISHING PROCESS

Van Pelt Brower, Wilbraham, Mass., assignor to Monsanto Company, St. Louis, Mo.

Filed May 19, 1975, Ser. No. 578,694

Int. Cl.² B22D *11/126*

U.S. Cl. 29—527.4 **3 Claims**



1. In the process for the preparation of die rolls used in the manufacture of plastic sheet for laminated safety glass which process comprises:

A. selecting a metal roll which is free of pits, holes or

scratches or other defects and which has a surface roughness of 32 RMS or smoother;

B. blasting the roll with abrasive grit to obtain a saturated surface on the roll;

C. plating the roll with a suitable metal; and then

D. roughening the plated surface by blasting with fine grit; the improvement which comprises blasting the roll with glass beads after the grit blasting step and before the chrome plating step wherein the glass beads have a particle size larger than the base diameters of the prominent peaks on the surface of the roll whereby the size and number of peaks on the roll is reduced such that the sheet material cast on the roll has a sheet surface which is characterized by having:

1. an arithmetic average roughness in the range of from 12 to 18 $\times 10^{-6}$ inches (3.1 to 4.6 microns) as calculated around a roughness mean centerline drawn through the peaks and valleys on the surface of the sheet; and

2. a roughness height in the range of from 48 to 10^{-6} to 72 $\times 10^{-6}$ inches (12.2 to 18.3 microns) wherein at a distance of 0.4 mil (10.2 microns) or less than the mean centerline going in the direction of the center of the sheet there are substantially no valleys on the surface of the sheet.

4,026,008

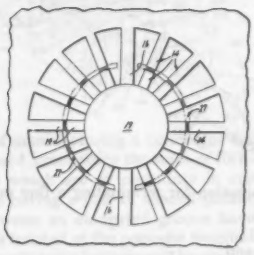
SEMICONDUCTOR LEAD STRUCTURE AND ASSEMBLY AND METHOD FOR FABRICATING SAME

Joseph M. Drees, Saratoga, and Fritz W. Beyerlein, Sunnyvale, both of Calif., assignors to Signetics Corporation, Sunnyvale, Calif.

Division of Ser. No. 293,929, Oct. 2, 1972, Pat. No. 3,902,148, which is a continuation-in-part of Ser. No. 93,092, Nov. 27, 1970. This application May 19, 1975, Ser. No. 578,668

Int. Cl.² B01J *17/00*

U.S. Cl. 29—574 **10 Claims**



1. In a method for fabricating a semiconductor assembly, providing a wafer having a plurality of semiconductor bodies formed therein with each of the semiconductor bodies having at least portions of an electrical circuit formed therein with contact pads in a predetermined pattern carried by the body and lying in a common plane, providing a thin metallic strip, forming a plurality of spaced arrays in said strip extending longitudinally of the strip with each array having a plurality of first leads arranged in a predetermined pattern, supplying semiconductor bodies from the wafer and bonding said semiconductor bodies to the spaced arrays provided on the strip, encapsulating the semiconductor body and the inner extremities of the leads to provide a pill-like package, separating the leads from the strip to provide an assembly while retaining the assembly in the strip by providing supports independent of the leads for supporting the assembly in the strip and testing electrical characteristics of the assembly by engaging the leads of the assembly while the assembly is being retained in the strip.

4,026,009

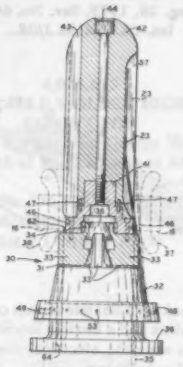
APPARATUS AND METHODS FOR ALIGNING AND PLACING INSULATING MEMBERS IN MAGNETIC CORE SLOTS

Alan L. Kindig, Holland, and Ronald H. Brown, Hamilton, both of Mich., assignors to General Electric Company, Fort Wayne, Ind.

Filed Mar. 11, 1976, Ser. No. 666,143

Int. Cl.² H02K *15/10*

U.S. Cl. 29—596 **12 Claims**



1. A method of placing insulating members along preselected slots of a slotted magnetic core having previously positioned wire segments disposed along closed ends of the slots; the method comprising: relatively positioning a plurality of preselected slots of the magnetic core in alignment with at least a corresponding number of elongate insulator guide means and a pathway for a corresponding plurality of elongated insulating members having a length at least generally commensurate with the axial length of the slots in the magnetic core, with different ones of the elongate guide means extending axially and radially with respect to individual ones of the slots so that a first portion of each elongate insulator guide means is disposed within a slot and a second portion of each such elongate insulator guide means is disposed radially inwardly of the stator bore opening for such slot; pushing the trailing end of the insulating members axially toward and into the core slots and engaging the first portions of an elongate insulator guide means with the leading end of at least one insulating member, and continuing to push the trailing end of the insulating members while at least the leading end of the at least one insulating member is guided along a preselected core slot by the elongate insulator guide means so that the at least one insulating member follows a path such that the at least one insulating member is held in spaced relationship to the wire segments disposed within the core slot; and ceasing to push the insulating members after they have been positioned in a desired axial position relative to the core slots.

4,026,010

METHOD FOR REMOVING THE STRAIN OF A SUBSTRATE FOR AN ELEMENT OF INTEGRATED CIRCUIT

Taro Igisu, No. 9, 12-Ban, 1-Chome, Jiyugaoka, Munakatacho, Munakatagun, Fukuoka, Japan

Filed June 21, 1976, Ser. No. 697,773

Int. Cl.² C21D *1/04;* **H05K** *13/00*

U.S. Cl. 29—625 **3 Claims**

1. In the method of fabricating an integrated circuit on a substrate by printing the circuit onto the substrate and curing, the improvement comprising removing the residual stresses of said substrate by mounting said substrate on a vibrating plate having a natural frequency below that of said substrate in such

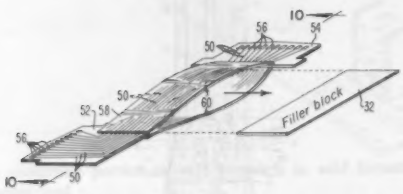
a manner as to be movably supported thereby with the aid of an elastic member and forcedly vibrating said substrate at a frequency below the natural frequency of said substrate, whereby said substrate is subjected to percussion.

4,026,011

FLEXIBLE CIRCUIT ASSEMBLY

Tommy L. Walton, Carlsbad, Calif., assignor to Burroughs Corporation, Detroit, Mich.

Filed Aug. 28, 1975, Ser. No. 608,550
Int. Cl.² B41M 3/08
U.S. Cl. 29—625 **6 Claims**



1. A method of making a flexible circuit connector assembly having rigid connectors and a flexible interconnecting cable in which there are no separate electrical connections therebetween, said method comprising:

forming an opening in a rigid panel of circuit board material, said opening being in the shape desired for a flexible interconnecting cable;

filling said opening with an intermediate member;

placing a metallic clad insulating film on said panel and covering said intermediate member;

bonding said insulating film only to said panel;

forming a plurality of conductors on said insulating film, said conductors extending over said intermediate member and terminating at each end in the shape of enlarged contact pads arranged in a row on spaced preselected portions of said panel, said preselected portions to serve as rigid connectors for the flexible circuit connector assembly;

bonding a cover layer to intermediate portions of the conductors, said cover layer being formed of a tri-layered laminate having a first outer layer of an insulating film, a second intermediate layer of a modified epoxy adhesive and a third layer of a phenolic resin adhesive which become bonded contiguous to said conductors;

removing peripheral portions of said panel while leaving said preselected connector portions and the intermediate member bridging said connector portions, said peripheral portions being removed so that each connector portion has an edge adapted to receive a female-type socket, with the row of contact pads on each connector being located near the edge; and

removing said intermediate member to leave a flexible cable interconnecting the connector portions, with said conductors providing an interfaceless electrically conductive path therebetween.

4,026,012

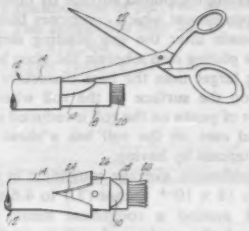
METHOD FOR INSTALLING A SHIELD CONNECTOR IN A CABLE

Donald J. Smith, Woodland Hills, and Paul C. Getz, Valencia, both of Calif., assignors to Smith-Schreyer & Assoc., Inc., Woodland Hills, Calif.

Filed June 30, 1975, Ser. No. 591,466
Int. Cl.² H02G 1/00; H01R 43/00
U.S. Cl. 29—628 **1 Claim**

1. A method for installing a shield connector in a cable having electrical conductors, a conductive shield surrounding the electrical conductors, and an outer cover surrounding the conductive shield, including the steps of

inserting a thin plastic piece between the shield and the electrical conductors of a cable;



cutting the outer cover and shield of the cable on the inserted thin plastic piece; and

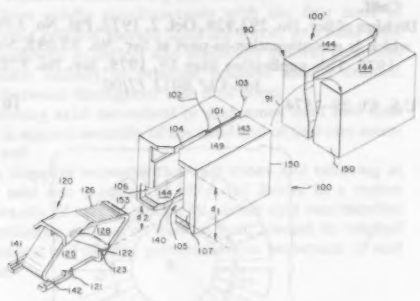
inserting a shield connector between the cut shield and the inserted thin plastic piece.

4,026,013

METHOD AND STRUCTURE FOR TERMINATING FINE WIRES

Donald Kent Hughes, Mechanicsburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Mar. 17, 1976, Ser. No. 667,773
Int. Cl.² H01R 43/00
U.S. Cl. 29—628 **19 Claims**



1. A combination for terminating a fine magnet wire and comprising:

a fine wire;

a contact; and

housing means comprising a cavity formed therein into which said contact is insertable and retainable;

said contact formed from a strip of metal and comprising:

first, second and third strip-like elements bent to form three sides of a trapezium and each having inner and outer surfaces generally perpendicular to a common plane;

said first and third strip-like elements being convergent at first ends thereof and spaced apart a given distance when not inserted in said housing;

said second strip-like element connected to the first end of said first strip-like element at an acute angle and to the first end of said third strip-like element at an obtuse angle when said contact is not inserted in said housing;

said first strip-like element having raised areas formed in the outer surface thereof;

said housing comprising:

a plurality of side walls and a first end wall defining a cavity therein which opens onto a second end opposite said first end, and a slot extending completely through

said housing except for a portion of a first of said side walls;

said wire wound around said portion of said first side wall;

said cavity configured to retain the first and second contact elements adjacent said first side wall and said first end wall, respectively, and to retain said third strip-like element adjacent a second side wall;

the distance between said first and second side walls being greater than said given distance;

said first end wall positioned to limit the depth of insertion of said first and second strip-like elements into said cavity;

said cavity further configured to receive and guide said third element further therein after the junction of said first and second strip-like elements abut against said first end wall to move said second strip-like element further towards said first end wall, thereby altering said acute and obtuse angles towards right angles and increasing the distance between the said first and third strip-like elements to force the raised areas of said first strip-like elements against said portion of said first side wall and said wire wound therearound.

4,026,014

METHOD OF MAKING CONNECTOR ASSEMBLY FOR PRINTED WIRING BOARD

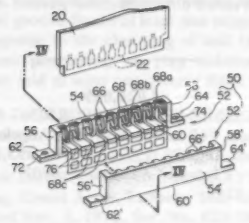
Kazuyasu Sugimoto; Hiroshi Yamaya, and Kameki Ishimoto, all of Kadoma, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed June 26, 1975, Ser. No. 590,680

Claims priority, application Japan, May 19, 1975, 50-60427

Int. Cl.² H02G *15/00*

U.S. Cl. 29—629 **8 Claims**



1. A method of manufacturing a connector assembly for a printed wiring board, comprising the steps of forming first and second segments which are to constitute in combination a housing structure having a pair of spaced parallel side walls forming therebetween an elongated groove having an open top end, end walls located at the opposite longitudinal ends of said elongated groove and a bottom wall located at the bottom of said elongated groove and formed with at least one opening which is arranged substantially in parallel with the inner faces of said side walls, said first and second segments having respective inner side edges which are to be in contact with each other when the segments are assembled together into the housing structure and each of said side edges having a longitudinal portion to constitute part of the bottom wall of the housing structure and a pair of vertical portions each of which is to constitute part of each of the end walls of the housing structure; forming a unitary blank of conductive material having a plurality of spaced parallel elongated portions and at least one longitudinal strip portion with which said elongated portions are integral in their respective portions to project outwardly from said bottom wall of said housing structure; positioning said blank on at least one of said first and second segments so that said elongated portions are each in part carried on the inner face of that portion of at least one of the segments which is to form at least one of said side walls of the housing structure, said longitudinal portion being located below said longitudinal portions of the side edge of the segment on which the blank is carried; positioning the first and second segments relative to each other so that said side edges of the segments are in contact with each other with said elongated portions of said blank projecting each inpart outwardly from the longitudinal portions of said edges; inseparably assembling the segments together along said side edges for forming said housing structure; and severing said longitudinal strip portion of said blank from said elongated portions so that the elongated portions are separate from each other and form contact elements.

4,026,015

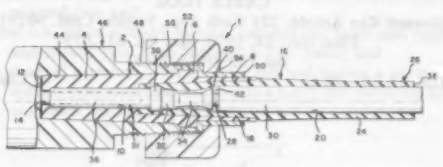
HEAT-SHRINKABLE MOLDED HIGH VOLTAGE CONNECTOR

Jan Philip Askman, Carlisle, and George Warren Wolverton, Elizabethtown, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Division of Ser. No. 570,128, April 21, 1975, Pat. No. 3,963,295. This application Mar. 29, 1976, Ser. No. 671,877

Int. Cl.² H02G *15/00*

U.S. Cl. 29—629 **2 Claims**



1. A method of manufacturing an electrical lead, comprising the steps of:

cutting to selected length a section of heat-shrinkable tubing,

placing said tubing over a mandrel having the shape of an electrical contact,

shrinking a portion of said tubing to conform to the shape of said mandrel and leaving the remainder of said tubing in unshrunk condition,

molding a sleeve of silicone rubber over the shrunk portion of said tubing and bonding the sleeve to said shrunk portion of said tubing to provide an electrical receptacle, and

removing said mandrel whereby the unshrunk portion of said tubing may freely receive an electrical lead and an electrical contact therein, and further whereby the unshrunk portion of said tubing may be shrunk into gripped relation over said lead with the contact received in said receptacle formed by said silicone sleeve.

4,026,016

RAZOR BLADE ASSEMBLY

Warren I. Nissen, Topsfield, Mass., assignor to The Gillette Company, Boston, Mass.

Filed May 12, 1975, Ser. No. 576,253

Int. Cl.² B26B *21/06, 21/22, 21/52*

U.S. Cl. 30—47 **18 Claims**

1. A razor blade assembly comprising a platform member, a blade means, and a cap member, said blade means being permanently disposed between said platform member and said cap member;

journal bearing means disposed on said razor blade assembly and adapted for connection with journals disposed on a razor handle to form a pivot axis for pivotal movement of said razor blade assembly upon said razor handle; and

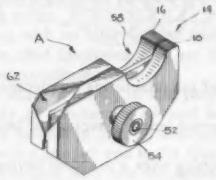
cam means disposed on said razor blade assembly, said cam

means including two intersecting surfaces forming a cavity having an internal angle with an apex removed from said pivot axis for receiving a biasing force from a cam follower means extending from said handle.

4,026,017
CABLE TOOL

Howard Kay Arnold, 221 Ruth Ave., Venice, Calif. 90291

Filed Nov. 14, 1975, Ser. No. 631,875
Int. Cl.² H02B 1/12
U.S. Cl. 30—90.6 15 Claims



1. A cable sheath cutter and stripper device for removing a portion of a sheath covering a cable, said device comprising:

a. an outer housing,

b. means forming a recess in said housing and sized to receive a sheath covered cable transverse to its length,

c. means forming a groove in another portion of said housing and also being sized to receive a sheath covered cable parallel to its length,

d. means forming a cavity in said housing to receive a blade-type cutting element of the type including a relatively long sharp cutting edge and a non-sharp grasping section capable of being grasped by the fingers of the user of said device, said blade being positionable in said housing so that said relatively long cutting edge is capable of extending into said recess in order to permit cutting the sheath during positioned rotation of the cable in the recess; one end of said cutting edge extending into said groove so that it is capable of severing the cable and sheath into a plurality of longitudinal sections during pulling of the sheathed cable in the groove parallel to its longitudinal axis,

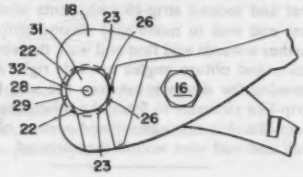
e. retaining and positioning means to removably retain said cutting element in said cavity and position said cutting element so that said cutting edge can be positionally located in said groove and said recess, and

f. said housing being shaped so that a pair of opposed portions forming part of said grasping section protrude outwardly of said housing so that said opposed portions can be grasped by the fingers of the user of said device without contact with the sharp cutting edge to positionally locate the cutting edge relative to said recess and said groove, said housing also having a sufficient size and shape so that all portions of said cutting edge can be retracted in said housing such that all portions of said cutting edge are unexposed in said groove and said recess.

4,026,018
CUTTING TOOL FOR COAXIAL CABLE

Bjarne I. Byberg, Walnut Creek, and Robert B. Kientz, Orinda, both of Calif., assignors to Benner-Nawman, Inc., Pleasant Hill, Calif.

Filed May 10, 1976, Ser. No. 684,576
Int. Cl.² B23B 13/06; B26D 3/16
U.S. Cl. 30—254 3 Claims

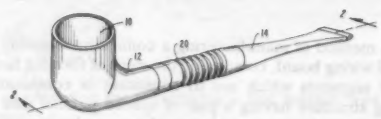


1. A cutting tool for cutting a cylindrical coaxial cable without substantial deformation, comprising a pair of lever members pivotally joined in plier fashion, each of said lever members including a jaw portion at one end thereof, said jaw portions being disposed in confronting relationship; each jaw including three linear cutting edges disposed coextensively and obliquely and defining a concave recess in the confronting edge of each jaw, said cutting edges of both jaws being disposed in confronting relationship to impinge generally equilaterally about an entire circumferential portion of said cylindrical cell.

4,026,019
FLEXIBLE SHOCK ABSORBING PIPE

Byron Schiffman, 760 Lillian Way, Los Angeles, Calif. 90028

Filed Aug. 30, 1973, Ser. No. 393,046
Int. Cl.² A24F 5/00, 7/02
U.S. Cl. 131—225 5 Claims



1. A novel and improved smoking pipe having a bowl for receiving tobacco, an extension from the base of the bowl, said extension having a generally centrally disposed smoke passage therein, and a stem including a mouthpiece, said stem having a passage through which smoke may be drawn from said bowl to said mouthpiece, said stem being carried by said extension; the improvement wherein said pipe has a flexible, shock-absorbing stem and extension system comprising a cylinder within said extension around said smoke passage, a piston connecting said stem to said extension, one end of said piston being received and reciprocable within said cylinder and the other end extending beyond said cylinder and forming a socket joint with said stem, a spring-like means being provided around said piston which normally biases the stem and piston away from said040259756 bowl, said stem being rotatable around said socket joint and said stem being advanceable toward said bowl when a force sufficient to overcome said spring bias is applied to said stem, and said piston being provided with a ball and said stem being provided with a complementary socket, said ball and said socket comprising said socket joint.

4,026,020
GUIDING RAIL ARRESTING DEVICE FOR MOTOR DRIVEN SAWS

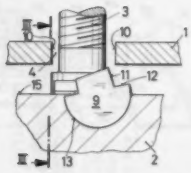
Klaus Höppner, Marbach (Neckar); Götz Landwehr, Korb; Adolf Wilhelm, Backnang-Steinbach; Wolfgang Meyer, Waiblingen; Gerd Frers, Weinstadt; Rolf Lohberg, Holzgerlingen; Dieter Reiff, Waiblingen; Karl Förderer, Korb, and Helmut Kosiollek, Korb, all of Germany, assignors to Andreas Stihl Maschinenfabrik, Neustadt, Germany

Filed Mar. 3, 1976, Ser. No. 663,294

Claims priority, application Germany, Mar. 5, 1975, 2509158

Int. Cl.² B27B *17/02*

U.S. Cl. 30—386 17 Claims



1. A motor driven hand saw, especially motor chain saw, which comprises in combination: a guiding rail with a guiding groove extending in the longitudinal direction of said rail, abutment means, clamping means for clamping said rail against said abutment means in a direction transverse to the plane of said rail, and counter guiding means associated with said abutment means for cooperation with the flanks of said guiding groove, said counter guiding means including for at least one of said groove flanks at least one supporting element operable in response to the clamping of said rail against said abutment means precluding all play automatically to be clamped against said at least one groove flank.

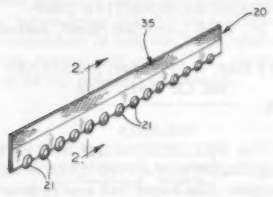
4,026,021
HOLDER FOR ORTHODONTIC TYING ATTACHMENT

Peter C. Kesling, Green Acres, LaPorte, Ind. 46350

Filed Nov. 3, 1975, Ser. No. 628,508

Int. Cl.² A61C *13/00*

U.S. Cl. 32—14 A 6 Claims



1. In combination with a disc-shaped orthodontic attachment having a protruding portion, a holder for holding the attachment during the securing of same to a tooth band, said holder comprising a pair of integrally connected panels folded together along a common edge and sandwiching therebetween the holder, an opening in said panels through the common edge having the attachment aligned therewith exposing nearly all of the attachment with the protruding portion centered through the opening at one panel so that the attachment may be placed upon a tooth band and held in place by engaging the holder during securing of same to the tooth band, means for holding the free edges of the panels together, and said opening being sized slightly under the size of the attachment such that the attachment cannot pass therethrough unless forced to do so which enlarges the opening.

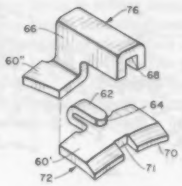
4,026,022
ORTHODONTIC APPLIANCE

Edward C. Paugh, Hacienda Heights, and Dan Q. Broughton, Laverne, both of Calif., assignors to Ormco Corporation, Glendora, Calif.

Division of Ser. No. 537,479, Dec. 30, 1974, abandoned. This application Oct. 14, 1975, Ser. No. 622,000

Int. Cl.² A61C *7/00*

U.S. Cl. 32—14 A 8 Claims



1. An orthodontic bracket comprising:
a generally planar base;
a tab extending above the surface of said base and having a pointed free end;
said tab, when initially formed, extends out from said base and is then bent back through a 180° bend; and
a channel member overlying said tab and having a portion spaced from said base to provide a notch for receiving an arch wire resting on said end.

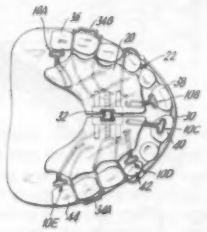
4,026,023
CLOSED FLAP SPRING FOR ORTHODONTIC APPLIANCES

Robert Leon Fisher, 108 E. 38th St., New York, N.Y. 10016

Filed Nov. 26, 1975, Ser. No. 635,153

Int. Cl.² A61C *7/00*

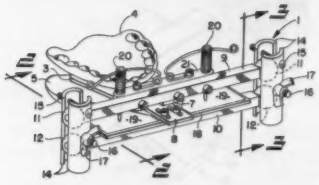
U.S. Cl. 32—14 E 14 Claims



1. An improved orthodontic appliance for controlling the directional movement of a tooth or teeth, said appliance having at least one closed flap spring with one end affixed and a free end engaging a tooth or teeth to be moved in which the improvement comprises:
a closed flap spring in the shape of a T, fashioned from a piece of wire, said closed flap spring having a substantially vertical portion and a substantially horizontal portion, the vertical portion having a pair of affixed tag portions at its lower end, a pair of substantially parallel spaced arm portions extending from said tag portions, a pair of rounded loop portions, one of said rounded loop portions extending generally horizontally outward from one of said arm portions in the opposite direction, and a bridge interconnecting said rounded loop portions, and said bridge portion forming said horizontal portion and engaging the tooth or teeth to be moved, such parallel arm portions, said loop portions and said bridge portion applying a controlled movement to said tooth or teeth,

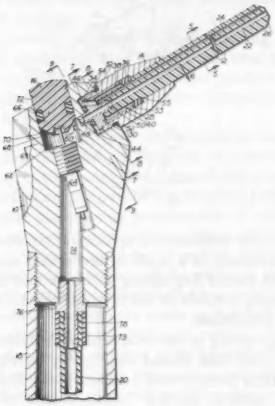
said loop portions and said bridge portion cushioning said force applied to said tooth or teeth.

4,026,024
VISE FOR TRANSFER OF CHECK-BITES
Michael Tradowsky, 10370 Blair Lane, Kirtland, Ohio 44094
Filed Oct. 20, 1975, Ser. No. 623,580
Int. Cl.² A61C *9/00*
U.S. Cl. 32—19 **6 Claims**



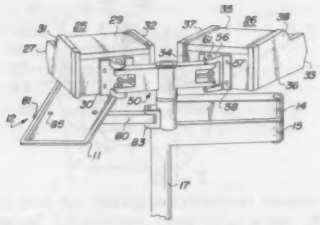
1. A vise for transfer of check-bites of a dental patient to a dental articulator comprising upper and lower center bearing plates carrying clutches fitting the patient's upper and lower arches and having forwardly extending exterior portions; upper and lower transverse bars having spherical ends secured between said ends to the respective exterior portions; the spherical ends of said lower transverse bar being spaced below the corresponding spherical ends of said upper transverse bar; and screw-actuated vise means spanning the corresponding ends of said bars for releasably frictionally gripping said spherical ends in any selected check-bite position of said plates and clutches.

4,026,025
DENTAL SYRINGE
Roderick S. Hunt, 13888 SW. Shireva Drive, Lake Oswego, Oreg. 97034
Filed Oct. 28, 1975, Ser. No. 626,111
Int. Cl.² A61C *19/02*
U.S. Cl. 32—22 **9 Claims**



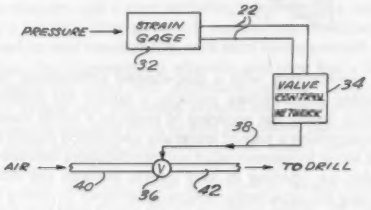
1. In a dental syringe for selectively injecting water and air into the oral cavity of a dental patient, said syringe having an elongate tip for guiding the water and air into said oral cavity, means for supporting said tip and means for supplying said tip with controlled amounts of pressurized water and air, the improvement wherein said tip comprises an elongate, flexible member of unitary construction for guiding both said water and said air along separate paths into said oral cavity, said tip having means defining a central longitudinal passage for guiding said water and means defining a plurality of longitudinal air passages surrounding said water passage for guiding said air.

4,026,026
APPARATUS FOR SUPPORTING RECEPTACLES FOR TRANSPOSITION
Howard M. Richardson, 2807 Benner St., Philadelphia, Pa. 19116
Filed Dec. 2, 1975, Ser. No. 636,924
Int. Cl.² A61C *19/02*
U.S. Cl. 32—22 **22 Claims**



1. Apparatus for supporting receptacle means, comprising:
articulated arm means on which said link means is supported for rotation, link means having a first rotational axis, and receptacle means, respectively pivotally connected to said link means on opposite sides of said first axis, whereby said receptacle means may be transposed from one side to the other of a plane containing said first axis by selectively pivoting said receptacle means about their axes and revolving said arm means about its axis,
container means for being supported on said receptacle means, said container means being constructed and arranged for being interposed between said receptacle means when said receptacle means are pivoted to a predetermined position, and
means for engaging said container means with at least one of said receptacle means.

4,026,027
DENTAL HAND DRILL EMPLOYING PRESSURE-SENSITIVE GRIP
August Kokal, Jr., 8710 Lone Star Road, Jacksonville, Fla. 32211
Filed Mar. 7, 1975, Ser. No. 556,460
Int. Cl.² A61C *1/08*
U.S. Cl. 32—26 **13 Claims**



1. In a fluid-driven rotary dental tool which includes an elongated body manipulatable by one hand of the operator, the improvement which comprises pressure-sensitive means integrally formed in said body for continuously controlling the speed of said rotary dental tool in proportion to the manual pressure exerted thereon by said operator, said pressure-sensi-

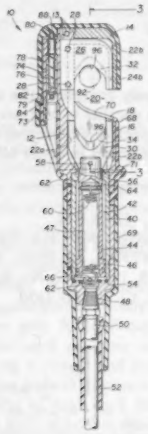
tive means comprising a material whose electrical resistance changes in proportion to its change in length.

13. A fluid-driven rotary dental tool which comprises an elongated body manipulatable by one hand of the operator, and strain-gage means integrally formed in said body for continuously controlling the speed of said rotary dental tool in proportion to the manual pressure exerted thereon by said operator.

4,026,028
CABLE CUTTING DEVICE

Cyril Robert Green, Honesdale, Pa., assignor to Mario D. Medio and Grace E. Medio, both of Malverne, N.Y.

Filed July 31, 1975, Ser. No. 600,872
Int. Cl.² B26B 29/00; B23D 29/00
U.S. Cl. 30—233 13 Claims

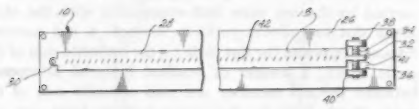


1. A cable cutter comprising
a housing having upper and lower supports,
a blade in each of said supports with one of said blades movable relative to the other,
each of said blades having cutting surfaces in planar wiping supporting relationship,
moving means connected with said one blade to move the blade relative to the other to cut a cable therebetween,
and shroud means covering said blades and a part of said shroud means being movable on said housing in response to the movement of said one blade against the cable and the cable against said part of said shroud to enable the cable to be cut between said blades.

4,026,029
APPARATUS FOR IMPROVING THE ACCURACY OF A FRICTION WHEEL DISTANCE MEASURING DEVICE

Irven H. Culver, Playa Del Rey, Calif., assignor to Secundus, Inc., San Lorenzo, P.R.

Filed Dec. 8, 1975, Ser. No. 638,554
Int. Cl.² G01B 3/12
U.S. Cl. 33—125 M 12 Claims

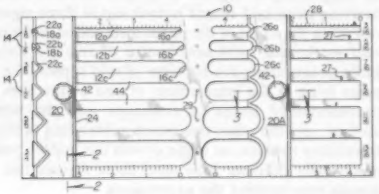


1. In a linear measuring system for a machine tool or the like having two relatively moving parts, one part moving in a fixed linear path relative to the other part, wherein a measuring device including a rotating sensing wheel and means driven by the wheel for indicating the extent of rotation of the wheel is secured to said one part of said two relatively moving parts with the sensing wheel in rolling contact with a surface associated with said other moving part, the improvement comprising: a longitudinal track member having a flat elongated surface, mounting means for securing the track member to said other of said two relatively moving parts with said surface extending parallel to said path of movement with the direction of elongation substantially parallel to the path of movement, the elongated surface being in rolling contact with said sensing wheel, said mounting means including means for adjusting the angle between the direction of elongation and said linear path, the perimeter of the wheel having striations extending at a skewed angle to the axis of rotation of the wheel, and the surface of the track member having an imprint of the striated wheel extending substantially the full length thereof.

4,026,030
DRAFTING TEMPLATE

Paul H. Kuever, deceased, late of San Gabriel, Calif., and Hazel J. Kuever, surviving spouse, 8357 Woodlawn, San Gabriel, Calif. 91775

Filed Dec. 29, 1975, Ser. No. 644,909
Int. Cl.² B43L 7/08
U.S. Cl. 33—174 B 12 Claims



1. A drafting template, comprising:
a. a flat relatively thin integral body of uniform thickness,
b. said body having a plurality of spaced stacked elongated cut-outs therethrough, forming openings with surrounding edges, providing guides for moving a pencil or the like in contact therewith, for forming a desired line on a drawing upon which a bottom face of the body is adapted to lie in contact therewith,
c. each opening including parallel edges of differing spacings therebetween,
d. a first straight edge joining the parallel edges of each opening at one end thereof and perpendicular thereto,
e. a second semi-circular edge joining the parallel edges of each opening at the other end thereof.
f. a slideable member moveable across the top face of the body in a direction parallel to said parallel edges and between ends of the openings,
g. said slideable member having a third straight edge at one side thereof crossing all of the openings perpendicular to their parallel edges,
h. said slideable member also having a plurality of cut-outs at an opposite side thereof forming fourth edges, each forming a symmetrical shape within a 180° arc, the ends of which arc join the parallel edges, forming ends of the opening with which each is associated.

4,026,031

SURFACE MEASUREMENT INSTRUMENTS

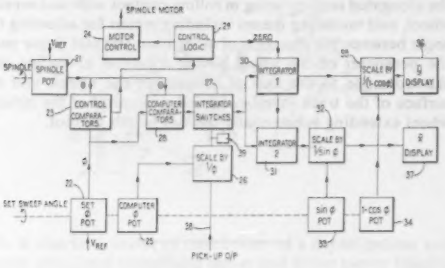
Graham John Siddall, Keyworth, England, and Michael Antony Player, Aberdeen, Scotland, assignors to The Rank Organisation Limited, London, England

Filed Sept. 24, 1975, Ser. No. 616,130

Claims priority, application United Kingdom, Sept. 24, 1974, 41561/74

Int. Cl.² G01B 7/28

U.S. Cl. 33—174 L 13 Claims



1. A method of determining the coordinates of the centre of curvature of the curved surface of a workpiece with respect to a predetermined frame of reference the origin of which coincides with the centre of relative rotation between the workpiece and a sensor of a surface measurement instrument of the type having a table on which a workpiece is mounted and a sensor which is drawn in contact with the surface of the workpiece to produce output signals representative of surface variations upon relative rotation of the sensor and the table on which the workpiece is mounted, comprising the steps of:

traversing the sensor over the workpiece surface to provide an output signal representing said surface, electrically deriving from said sensor output signal three signals representing the value of the radial distance of said surface of said workpiece from said centre of relative rotation at three points along the traverse of said sensor, the middle point lying at the intersection of one of the axes of said predetermined frame of reference and the workpiece surface, and the other two points subtending at the centre of relative rotation an angle ϕ with the middle point, and electrically deriving from said three signals two output signals representing the expressions

$$\bar{x} = \frac{r_3 - r_1}{2\sin\phi}$$

and

$$\bar{y} = \frac{2r_2 - (r_1 + r_3)}{2(1 - \cos\phi)}$$

where $\bar{x}$ and $\bar{y}$ respectively represent the coordinates of the centre of the workpiece parallel to and perpendicular to said one axis and r_1, r_2, r_3 respectively represent the radial distance determined at said three points in order along said traverse.

8. Apparatus for determining the coordinates of the centre of curvature of the curved surface of a workpiece with respect to a predetermined frame of reference the origin of which coincides with the centre of relative rotation between the workpiece and a sensor of a surface measurement instrument of the type having a table on which a workpiece is mounted and a sensor which is drawn in contact with the surface of the workpiece to produce output signals representative of surface variations upon relative rotation of the sensor and the table on which the workpiece is mounted,

said apparatus comprising:

means for traversing the sensor over the workpiece surface whereby to provide an output signal representing said surface,

means for deriving from said sensor output signal three signals representing the value of the radial distance of said surface of said workpiece from said centre of relative rotation at three points along the traverse of said sensor, the middle point lying at the intersection of one of the axes of said predetermined frame of reference and the workpiece surface, and the other two points subtending at the centre of relative rotation an angle ϕ with the middle point, and

means for deriving from said three signals two output signals representing the expressions

$$\bar{x} = \frac{r_3 - r_1}{2\sin\phi}$$

and

$$\bar{y} = \frac{2r_2 - (r_1 + r_3)}{2(1 - \cos\phi)}$$

where $\bar{x}$ and $\bar{y}$ respectively represent the coordinates of the centre of the workpiece parallel to and perpendicular to said one axis and r_1, r_2, r_3 respectively represent the radial distance determined at said three points in order along said traverse.

4,026,032

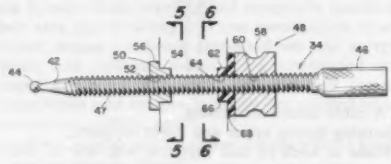
BOW SIGHT MECHANISM

Jimmie Thomas Smith, 6737 E. 5th Place, Tulsa, Okla. 74112

Filed Oct. 28, 1975, Ser. No. 626,357

Int. Cl.² F41G 1/00

U.S. Cl. 33—265 6 Claims



1. An archery bow sight adapted for mounting on an archery bow for an aid in directing the longitudinal flight of an arrow and comprising;

a. an elongated guide block vertically attachable to a bow and having a vertically disposed elongated slot extending transversely through the guide block;

b. at least one elongated sighting pin horizontally adjustable for windage adjustment through and vertically slidable within said elongated slot, said at least one sighting pin being provided with a plurality of threads around the outer periphery thereof terminating at one end with a sighting bead thereon;

c. range locking means carried by said at least one sighting pin engageable with the guide block for selective locking of said at least one pin in said at least one desired vertical location within the slot and wherein the range locking means comprises a nut plate engageable with one side of the guide block and having a threaded bore therethrough for threadedly receiving the pin, anti-rotation means carried by the nut plate and engageable with the elongated slot to prevent rotation thereof, a nut member disposed opposite the nut plate on the opposite side of the guide block, a washer of resilient material interposed between the nut member and said opposite side of the guide block whereby tightening said at least one nut member against said opposite side of the guide block with said washer therebetween permits selective locking of the sighting pin in the desired vertical position within the slot

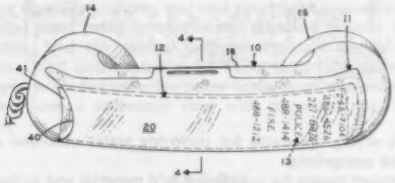
and whereby increased friction between said at least one guide block and nut member caused by the washer prevents rotation of said at least one nut member when said at least one sighting pin is rotated for windage adjustments.

4,026,033

TELEPHONE HANDSET INDICIA HOLDER

Forrest D. Martin, 3106 Fairfax Ave., Clovis, Calif. 93612

Filed May 17, 1976, Ser. No. 686,699
Int. Cl.² G09F *3/06*
U.S. Cl. 40—336 **1 Claim**



1. In combination with a telephone handset having a mouthpiece, an ear piece and a grip interconnecting said pieces, said grip being characterized by a back surface of a transversely flat, longitudinally convex configuration and side edge surfaces of substantially planar configurations normally related to said back surface, a unitary indicia holder formed of a resilient, transparent material and supported in friction-fit engagement with said grip, comprising:

A. a back member of a transversely flat, longitudinally convex configuration uniformly spaced from the back surface of the grip for defining between the opposed surfaces of the back member and the back surface an envelope having a closed end and an open end;

B. a sheet bearing indicia disposed within said envelope;

C. means defining in said back member, in juxtaposition with the open end, an access relief of an arcuate configuration through which access to said sheet is afforded;

D. a pair of uniformly spaced side members of substantially planar configuration integrally related with said back member and extended in contiguous relation with the side edge surfaces of said grip; and

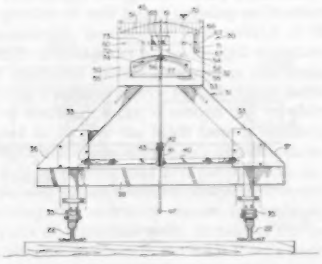
E. clasping means for securing said holder in fixed relation with said grip including a pair of beads projected from the side members into an engaged relationship with the side edge surface of the grip.

4,026,034

NEEDLE INDICATOR FOR RAIL LINER

John Kenneth Stewart, Columbia, S.C., assignor to Canron, Inc., Phillipsburg, N.J.

Filed Sept. 8, 1975, Ser. No. 611,163
Int. Cl.² B61K *9/08;* **E01B** *29/04*
U.S. Cl. 33—338 **12 Claims**



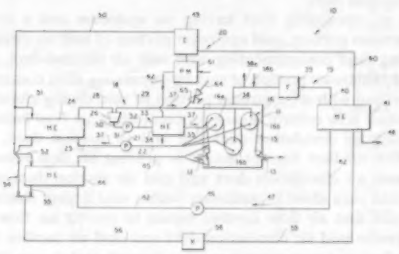
1. A reference system having a reference wire tautly extended along a railroad track between front and rear anchor points, an indicator mechanism for an apparatus for correcting the existing grade and horizontal alignment of railroad track, said mechanism comprising frame means, the position of said frame means in use being referenced to the existing position of an adjacent section of the railroad track, pivot means mounted for vertical, sliding movement on said frame means, a needle indicator mounted on said pivot means to pivot about a horizontal axis generally parallel to the reference wire, index means arranged on said frame means to indicate in combination with said needle indicator the existing grade and horizontal alignment of said adjacent section with reference to said reference wire the position of said needle indicator being adjusted by said reference wire in contact with said needle indicator.

4,026,035

DRYER WITH LOW TEMPERATURE HEAT RECOVERY SYSTEM

David F. Dyer, and Glennon Maples, both of Rte. 2, Box 11, Waverly, Ala. 36879

Filed Feb. 6, 1976, Ser. No. 655,694
Int. Cl.² F26B *3/04*
U.S. Cl. 34—23 **8 Claims**



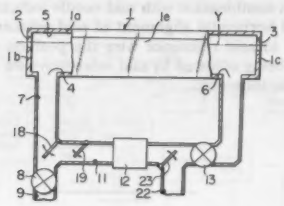
1. In a process of drying wet products such as textile or paper webs wherein a web is moved along its length through a housing and progressively about the convex surfaces of a plurality of rotary cylinders or the like in the housing and steam is injected into the rotary cylinders to heat the cylinders and the web as the web moves about the cylinders, the improvement comprising removing water from the condensed steam in the cylinders, heating the removed water until steam is regenerated from the water, separating any water from the regenerated steam, injecting the regenerated steam into the rotary cylinders, heating the separated water until a high temperature steam is formed at a temperature higher than the temperature of the regenerated steam, and injecting the high temperature steam into the rotary cylinders, removing gas from the housing, removing moisture from the gas, heating the gas, and directing the gas back to the housing against the web as the web moves through the housing, heating a fluid to a gaseous state, and wherein the step of heating the removed water comprises heating the removed water by condensing the heated fluid from a gaseous state, to a liquid state and wherein the step of heating the gas comprises heating the gas by condensing the heated fluid from a gaseous state to a liquid state, and wherein the step of removing the moisture from the gas comprises cooling the gas with the condensed fluid in a liquid state while simultaneously converting the fluid from a liquid state to a gaseous state for reheating and recycling.

4,026,036

APPARATUS FOR CONTROLLING TEMPERATURE ON A DRYING MACHINE FOR RUNNING YARN SHEETS

Masayoshi Tanaka, Kanazawa, Japan, assignor to Tsudakoma Kogyo Kabushiki Kaisha, Japan

Filed July 31, 1975, Ser. No. 600,646
Claims priority, application Japan, June 6, 1975, 5067486
Int. Cl.² F26B 21/04
U.S. Cl. 34—54 11 Claims



1. Apparatus for drying sheets of yarn, comprising:

a substantially enclosed drying chamber elongated in the running direction of said yarn sheet and having openings to permit the free passage of said yarn sheet therethrough;

an air suction duct having an upstream portion and a downstream portion, said upstream portion of said air suction duct communicating with a downstream portion of said drying chamber;

an air exhaust duct including a fan, said air exhaust duct communicating with said downstream portion of said air suction duct;

an air circulating duct having an upstream and a downstream portion, said upstream portion of said air circulating duct communicating with said air suction duct, said downstream portion of said air circulating duct communicating with an upstream portion of said drying chamber;

first air flow control means for controlling air flow between said air circulation duct and said air suction duct, said first air flow control means to prevent air flow between said air circulation duct and said air suction duct when said yarn sheet is stationary within said drying chamber, said first air flow control means to permit air flow between said air circulation duct and said air suction duct when said yarn sheet is moving through said drying chamber at a satisfactory speed;

heater means for supplying thermal energy to said air circulating duct at a point intermediate the point at which said air circulation duct communicates with said air suction duct and the point at which said air circulation duct communicates with said drying chamber;

a cool air supply duct communicating with said air circulation duct at a point intermediate the point at which said heater means supplies thermal energy to said air circulation duct and the point at which said air circulation duct communicates with said drying chamber;

second air flow control means for controlling air flow between said cool air supply duct and said air circulating duct, said second air flow control means to permit air flow between said cool air supply duct and said air circulating duct when said yarn sheet is stationary within said drying chamber, said second air flow control means to prevent air flow between said cool air supply duct and said air circulating duct when said yarn sheet is moving through said drying chamber at a satisfactory speed; and

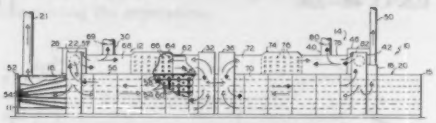
an air circulating fan located in said air circulating duct at a point intermediate the point at which said cool air duct communicates with said air circulating duct and the point at which said air circulating duct communicates with said drying chamber, said air circulating fan to circulate air in a direction from said air circulating fan to the point at which said air circulating duct communicates with said drying chamber.

4,026,037

APPARATUS FOR STEAM DRYING

Adolf Buchholz, 11694 SE. Clover Lane, Portland, Oreg. 97266

Filed Feb. 18, 1975, Ser. No. 550,573
Int. Cl.² F26B 21/06, 17/10
U.S. Cl. 34—57 R 15 Claims



1. A drying apparatus for removing water absorbed in a material comprising:

container means for containing said material and including means for moving said material through inlet and outlet ends of said container means during drying;

heating means for producing a heating fluid within said container means from water evaporated from said material, said heating fluid consisting of at least a major portion of superheated steam;

contacting means for contacting said material with said steam within said container means to heat said material and vaporize said water absorbed therein, whereby said water is removed from said material;

means for preventing the entry of ambient air into said container means through said open ends;

means for producing a negative internal pressure within the container means along at least the major portion of its length, said negative pressure being below the ambient pressure of the atmosphere surrounding said container means; and

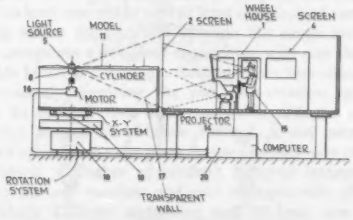
means for removing a minor portion of said steam from said container means.

4,026,038

SHIP'S MANEUVERING SIMULATOR

Lubbertus Sunter, Voorburg, and Geert Jan Prins, Delft, both of Netherlands, assignors to Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek Ten Behoeve Van Nijverheid, Handel en Verkeer, The Hague, Netherlands

Continuation-in-part of Ser. No. 538,324, Jan. 3, 1975, abandoned, and a continuation-in-part of Ser. No. 372,038, June 21, 1973, abandoned. This application Apr. 5, 1976, Ser. No. 673,363
Claims priority, application Netherlands, July 10, 1972, 7209572
Int. Cl.² G09B 9/08
U.S. Cl. 35—10.2 3 Claims



1. A maneuvering simulator, comprising a ship wheel house having a central point location therein, at least two abutting

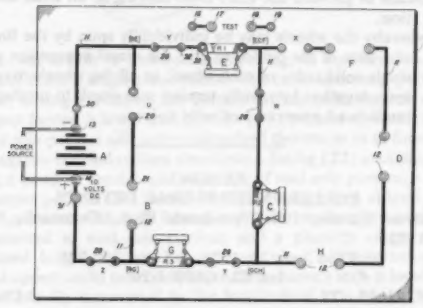
translucent projection screens disposed at an angle to one another and located at a distance from said wheel house, each of said screens having an inner surface and an outer surface a stationary point light source located at a distance behind each said screen, models of coastal terrains associated with said point light sources, each model having a scale factor; means cooperating with each said point light source for effecting the projection of air/water shadow images therefrom onto the outer surfaces of said screens, means for moving said cooperating means and said models, a computer for controlling the movement of said moving means, and a projection device for projecting a motionless image of a portion of a forepart of a ship onto the inner surface of one of said screens, said models being mutually uniform, and said point light sources and said central point being symmetrically disposed relative to said screens, and the mutual relative distances between said sources and said central point being such that the shadow images projected onto the outer surfaces of said screens together form a panoramic view with respect to said central point.

4,026,039

EDUCATIONAL DEVICE FOR LEARNING BASIC MEASUREMENTS

Charles G. Valentine, Stamford, Conn., assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 27, 1973, Ser. No. 355,138
Int. Cl.² G09B *23/18*
U.S. Cl. 35—19 A **6 Claims**



1. An educational kit programmed for teaching about electrical meters comprising in combination:

a. a simulator board including (i) on a first area of said board graphic indicia on a surface thereof defining an electrical circuit including a plurality of broken portions in said circuit and indicia separately identifying each of said broken portions each of said broken portions adapted to receive a resistor to complete the electrical connection across said broken portion; a plurality of electrical jacks, each of said jacks being arranged within said circuit and being electrically connected to the bottom portion of said broad defining an incomplete circuit as graphically depicted on said surface of the board, a plurality of said jacks being adapted to receive the leads from electrical meters and means for connecting and metering a voltage source to said circuit including a first pair of electrical jacks, a second pair of electrical jacks adapted to receive the leads from a voltmeter whereby the input voltage to the boards circuit can be measured and indicia defining said first pair of jacks as the voltage source; and (ii) on a second area of said board means for measuring the resistance values for resistors including two pairs of electrical jacks, certain of the jacks in said pairs adapted to connect the leads from a resistor thereto and certain of the jacks in said pairs being adapted to receive the leads from an ohmmeter;

b. a plurality of mounted resistors each including a pair of male plugs adapted for insertion within a pair of said female jacks on said board to abridge one of said broken portions within the circuit, and a pair of female jacks for connecting the leads from a voltmeter to said mounted resistor whereby the voltmeter is connected in parallel with said resistor in said circuit for measuring the voltage across said resistor, said mounted resistors further adapted for use with said resistance measuring means; and

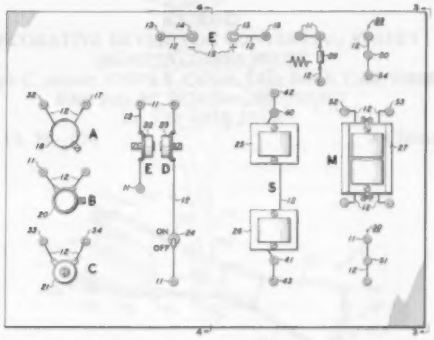
c. audio-visual instruction means for presenting information relating to the use and operation of electrical meters, said audio-visual instruction means including visual and audio instructional portions terminating in audio directions to the user of said kit to perform a manipulative activity using the first and second areas of said simulator board and said mounted resistors, said instruction means stopping upon completion of said audio directions and being restartable by the kit user upon completion of said manipulative activity.

4,026,040

EDUCATIONAL DEVICE FOR LEARNING ABOUT INDUCTORS

Charles G. Valentine, Stamford, Conn., and Douglas C. Covert, Royal Oak, Mich., assignors to Xerox Corporation, Stamford, Conn.

Filed July 26, 1973, Ser. No. 383,370
Int. Cl.² G09B *23/18*
U.S. Cl. 35—19 A **11 Claims**



1. An educational kit for teaching the induction of electrical current and the function of inductors in electrical circuits comprising in combination:

a. a simulator board having mounted on a surface thereof a plurality of electrical jacks, said board including (i) at a first area on said surface at least one air core inductor and at least one choke inductor, each of said inductors having a different number of wire turns and each having in spaced relation and electrically wired thereto a pair of said jacks, whereby the user of said kit measures a magnet with said inductors to induce a current and connect a meter to each of the inductors to measure the induced current thereby observing the effect of varying the number of wire turns on an inductor; (ii) at a second area on said surface of said board a first and second inductor, said inductors being spaced from each other at a distance sufficient to permit current to be induced in said first inductor when a current is applied to said second inductor and two pairs of said jacks, said second inductor being electrically connected to an electrical switch and one pair of said jacks and said first inductor being electrically connected to another pair of said jacks, whereby the user of said kit measures and observes the induction of current from one inductor to another; (iii) at a third area on said surface of said board means adapted to permit the user of

said kit to design and assemble electrical circuits including at least one inductor whereby said user observes and measures the effects of inductors in active electrical circuits that said user designs and assembles; and (iv) at a fourth area of said surface of said board means for connecting a voltage source to said second and third areas on said board; and

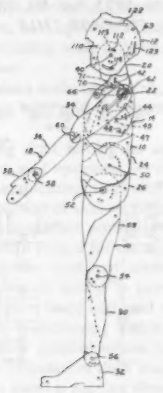
b. audiovisual instruction means for presenting information relating to the induction of electrical current and the functions of inductors in electrical circuits, the user of said kit employing in proper sequence the first, second, third and fourth areas of said board in response to instructions given by said instruction means.

4,026,041

TWO-DIMENSIONAL DRAWING BOARD MANIKIN

Kenneth W. Kennedy, Yellow Springs, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Apr. 28, 1976, Ser. No. 681,018
Int. Cl.² B43L *13/22*
U.S. Cl. 35—26 **6 Claims**



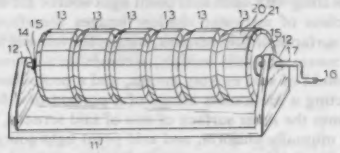
1. A two dimensional drawing board manikin, comprising: a head member; a neck member pivotably connected to said head member; an upper torso member pivotably connected to said neck member; a middle torso member pivotably connected to said upper torso member; a lower torso member pivotably connected to said middle torso member; means for restricting movement of the head, neck, upper torso member, middle torso member and lower torso member to anatomically correct positions; an upper leg member pivotably connected to said lower torso member at a position approximately corresponding to the hip joint; a lower leg member pivotably connected to said upper leg member at a position approximately corresponding to the knee joint; a foot member connected to said lower leg member at a position approximately corresponding to the ankle joint; an upper arm member movably and pivotably connected to the upper torso member at positions corresponding to positions which may be assumed by the shoulder joint; a lower arm member pivotably connected to said upper arm member at a position approximately corresponding to the elbow joint; a hand member pivotably connected to said lower arm member at a position approximately corresponding to the wrist joint; said manikin including means, on said head member, said torso members and said leg members, for providing two opposite substantially flat surfaces adapted to lay flat on a drawing board.

4,026,042

COLOR TOY DEVICE

Alvin G. Ames, P.O. Box 3500, San Diego, Calif. 92103

Filed Dec. 22, 1975, Ser. No. 642,893
Int. Cl.² G09B *1/02*
U.S. Cl. 35—28.3 **1 Claim**



1. In an educational color toy device:

an elongated base having an upright wall at each end thereof;

a shaft extending through said walls, spanning the space therebetween, and having a crank at one end exterior to the wall at that end, whereby the shaft can be rotated manually;

a plurality of cylindrical wheels, each wheel having alternating axially extending stripes of at least two different colors, on the curved surfaces thereof;

said wheels each having a centered hole and the wheels being coaxially mounted, in side by side relation, for free individual rotation on said shaft between said upright walls; and

means to prevent the shaft from moving in an axial direction;

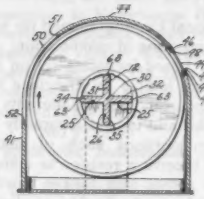
whereby the wheels may be individually spun by the finger of a user of the device to give the visual impression of a single solid color of each wheel, or all the wheels may be spun together by rapidly turning said crank to produce a multi-hued panorama of solid colors.

4,026,043

ROLLERS WITH PLURAL DETENTS

Andrew Caruso, 104 Wyandanck Blvd., Commack, N.Y. 11725

Filed June 28, 1976, Ser. No. 700,725
Int. Cl.² G09B *1/20*
U.S. Cl. 35—77 **3 Claims**



1. An improved word forming device comprising: a base element having a lower wall member and a pair of trunnions extending upwardly therefrom, an axle element carried by said trunnions in fixed relationship thereto and having a cross section defining a plurality of free edge surfaces extending parallel to the axis of said axle element, a plurality of character-bearing wheels each having a hub defining a cylindrical recess rotatably positioned upon said axle element to engage said free edge surfaces thereof and defining plural detent recesses each selectively resiliently engagable with one of said elongated free edge surfaces; whereby said wheels may be rotated to be resiliently maintained against movement in any of a plurality of arcuate positions relative to said axle element; said wheels each having a peripheral surface defining juxtaposed locations at least equal in number to the number of possible detented positions obtained by the engagement of a

detent recess with a free edge surface of said axle element, and individual alphabetic character positioned at the majority of said locations.

4,026,044

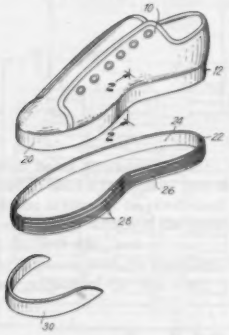
ARTICLE OF FOOTWEAR AND METHOD OF MAKING SAME

Jonas Senter, Greenwich, Conn., assignor to CITC Industries, Inc., New York, N.Y.

Continuation of Ser. No. 473,317, May 24, 1974, abandoned. This application Aug. 13, 1976, Ser. No. 714,263

Int. Cl.² A43C *13/08*

U.S. Cl. 36—14 **1 Claim**



1. An article of footwear comprising, in combination, an upper (**10**); a single-piece rubber-like outer shoe-sole portion (**12**) having a tread on the bottom surface (**18**) thereof; said upper having a lower end portion (**14**) thereof embedded in said sole portion and being vulcanized thereto so as to form an integrally bonded unitary structure; a foxing (**22**) encompassing a circumferential side wall (**20**) of said sole portion; a toe bumper portion (**30**) fastened to said foxing along at least the toe portion, with said foxing and said toe bumper portion cemented to said sole portion; and a plurality of parallel spaced longitudinal arch-supporting ribs (**32**) internally of said upper, on its inner side where the wearer's arch is located, substantially transversal to the longitudinal axis of the footwear, integrally formed with an upper surface (**16**) of said sole portion and adapted to be covered by an inner sole.

4,026,045

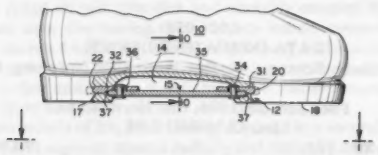
BOOT SOLE STRUCTURES

Barry L. Druss, Holliswood, N.Y., assignor to Chimera R. & D., Inc., Holliswood, N.Y.

Filed Dec. 3, 1975, Ser. No. 637,824

Int. Cl.² A43B *23/00*

U.S. Cl. 36—108 **15 Claims**



1. A boot sole structure for stiffening the sole (**12, 55**) of a boot (**10, 51**) in an arch area (**14**) of the sole between heel (**17**) and toe (**18**) portions thereof, the structure comprising: a bracket assembly (**15**) including at least two bearing members (**31/32; 31, 32/35; 31, 32/35, 35**), braced against corresponding support surfaces (**23, 24**) on respective opposed supporting portions (**20, 22**) of the sole, which surfaces at least partly flank the arch area, said members having respective contact surfaces (**37, 38**) thereon, and means (**34, 36, 36'**) for interlocking one of said members in its assembled condition with respect to at least one other member.

4,026,046

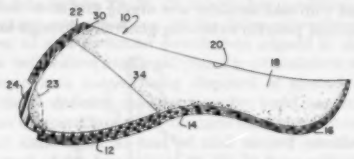
DANCING SLIPPER WITH SELF-MOLDING TOE INSERT

Ann V. Clark, 816 Elm St., Fayetteville, N.C. 28303; Frank A. Cannavo, Federal Bldg. (301 Green), Fayetteville, N.C. 28301, and Donald L. Cannon, 125 N. Main St., Hope Mills, N.C. 28348

Filed July 29, 1976, Ser. No. 709,851

Int. Cl.² A43B *3/00*

U.S. Cl. 36—113 **10 Claims**



5. A dancing slipper comprising a main skeleton body portion with a top opening to receive a foot therethrough, said shoe having an opening across the front thereof to receive the toes of the wearer, and a detachably connected toe receiving insert disposed in said body portion and projecting outwardly of said front opening.

4,026,047

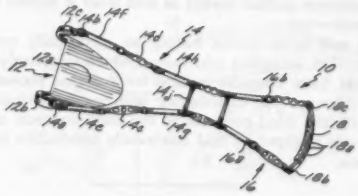
DECORATIVE DEVICE FOR CONVERTING STREET SHOES TO DRESS SHOES

Joseph C. Ahmer, 5349½ E. Carson, Long Beach, Calif. 90808

Filed July 30, 1976, Ser. No. 709,967

Int. Cl.² A43B *23/00*

U.S. Cl. 36—136 **8 Claims**



1. Decorative device for converting street shoes to dress shoes, comprising in combination,

a mounting tab insertable into a shoe at the rear thereof,

decorative means having one end connected to said mounting tab and another end in depending relation thereto,

and a flexible connector to be positioned about the heel of said shoe and connected to said other end of said decorative means to retain the latter against the back of the shoe.

4,026,048

MULTIPLE CIRCUIT CONTROL

Jack C. Hill, Milwaukee, and David E. Bennett, Waukesha, both of Wis., assignors to Douglas Dynamics Corporation, Milwaukee, Wis.

Filed Dec. 31, 1975, Ser. No. 645,515

Int. Cl.² E01H *5/04;* **H01H** *9/06*

U.S. Cl. 37—42 R **16 Claims**

1. A control box comprising, in combination,

a housing,

means defining an opening in said housing including a plu-

rality of generally linear portions radiating from a common, generally central area so that said linear portions define a plurality of guideways radiating from said common area,

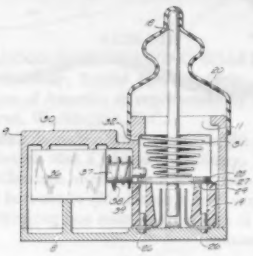
lever means extending through said opening into the interior of said housing,

means defining a laterally extending, generally annular flange on said lever means,

means defining a plurality of fixed electrical contact means within said housing and surrounding said lever means in an array corresponding generally to the orientation of said guideways relative to each other,

means defining a shoulder within said housing,

means supporting said lever means in said housing and including biasing means urging said flange into engagement with said shoulder and urging said lever means into a normal position extending generally through said common area and spaced from said fixed contacts and further supporting said lever means for selective movement, against said biasing means, into one of said guideways for selective engagement with at least one of said fixed contacts,



electrical circuit means including common electrical contact means extending over said shoulder and between said shoulder and said flange, said flange nutating on said common contact means as said lever is moved into said guideways,

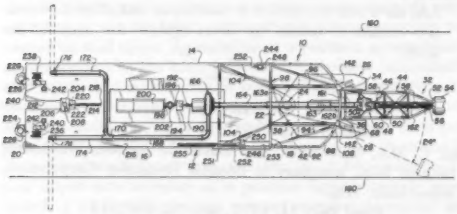
and said lever means having an electrically conductive portion, including said flange, which selectively engages said fixed contacts as said lever means moves in said guideways for establishing selective electrical circuits with the fixed contacts as the fixed contacts are selectively engaged by said electrically conductive lever portion.

4,026,049

ARTICULATING DREDGE

Alton J. Johnson, 902 Tanglewood Drive West, Irving, Tex. 75061

Filed Dec. 5, 1975, Ser. No. 637,898
Int. Cl.² E02F *3/88*
U.S. Cl. 37—67 **10 Claims**



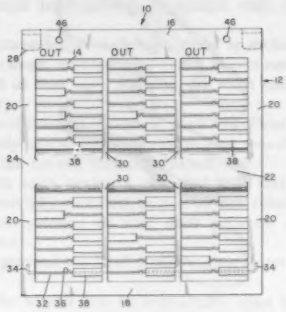
10. A dredge comprising: a main barge; an articulated hull section; means to pivotally secure the hull section to the barge; means to move the hull section horizontally relative to the barge; a dredge cutter means secured to the bow of the hull section; and means extending outwardly from the bow of the barge and positioned over the upper portion of the articulated hull section, and support means moveably securing the means extending outwardly from the bow of the barge to the articulated hull section to limit vertical movement of the hull section relative to the barge, said support means adapted to allow horizontal movement of the hull section relative to the barge.

4,026,050

GROCERY SHOPPING LIST

Bruce Aaron Boles, 419 E. 54th St., Hialeah, Fla. 33013

Filed July 6, 1976, Ser. No. 702,699
Int. Cl.² G09F *7/10*
U.S. Cl. 40—65 **3 Claims**



1. A shopping reminder (**10**) comprising a book-form casing (**12**) having a pair of complementary flat rectangular covers (**14**), said covers being comparatively rigid, a flexible hinge portion (**22**) integrally securing said flat covers together for folding one over the other into closed book form, said covers having upstanding rigid end and side boundary portions (**16, 18, 20**), said side edge boundary portions extending to said hinge portion, a plurality of upstanding raised ribs (**30**) extending at right angles to said hinge portion (**22**) and between and parallel to said opposite side portions (**20**) of each cover (**14**), a plurality of rod members (**32**) anchored in said side edge boundary portions (**20**) in spaced apart parallel relationship through said ribs (**30**), said rod members being substantially straight between their anchoring ends (**34**) except for a mid-point hump (**36**) between said ribs (**30**), or between a rib (**30**) and its adjacent side boundary (**20**), and a plurality of indication (**44**) carrying longitudinal slide members (**38**) each having an elongate slot (**42**) of a size to slip over said rod (**32**) and a central elongate tubular opening (**40**) to ride on said rod and over said hump (**36**), said hump (**36**) yieldably holding said indicator slide (**38**) against freely sliding thereover.

4,026,051

DATA-INDICATING DEVICE

Hans Wilhelm Scharrer, Further Strasse 4b, Nurnberg, Germany

Filed Jan. 26, 1976, Ser. No. 652,612
Int. Cl.² G09D *3/08*
U.S. Cl. 40—113 **9 Claims**

1. An indicator device, having a multitude of data-carrying rotatable discs, wherein the indications of the discs are visible through portions of a frontal cover plate of a casing, comprising:

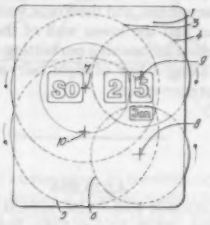
a cover plate having apertures;

at least one first disc of the discs being rotatably mounted on a first pivot and being provided with an inner portion comprising a transparent material, and having an outer,

non-transparent peripheral portion, the non-transparent peripheral portion of the first disc serving as a data-carrier means;

a second disc being arranged behind the first disc and being rotatably mounted on a second pivot offset with respect to the first pivot;

a third disc being arranged behind said second disc and being rotatably mounted on a third pivot offset with respect to the first and the second pivots;



the second disc being arranged between the first disc and the third disc in such a fashion so that the data carried by the second disc arrives to be positioned behind the transparent inner portion adjacent the data of the peripheral portion of the first disc, and

the third disc disposed with its data also behind the transparent inner portion of the first disc.

4,026,052

MULTI-DISK ROTATABLE YEAR CALENDAR

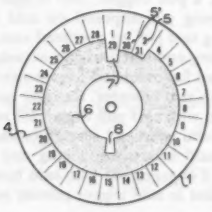
Toru Ando, 2-6-12 Matsugaoka, Chigasaki, Kanagawa, Japan

Filed Mar. 22, 1976, Ser. No. 669,399

Claims priority, application Japan, Sept. 25, 1975, 50-131279[U]; Mar. 27, 1975, 50-41064[U]

Int. Cl.² G09D *3/08*

U.S. Cl. 40—115 **5 Claims**



1. A calendar for a particular one-year, comprising

a circular date disk having a center,

a circular week disk having a center and coaxially superimposed on said date disk and rotatably coupled therewith,

said date disc having thereon date indicia comprising numerals 1 to **28, 29, 30, 31,** respectively and consecutively, said indicia **1–28,** inclusively, being circularly arranged in a first annular band defining a first radial distance range from said center of said date disc,

said indicia of **29, 30, 31** being disposed in a second annular band segment spaced radially and inwardly of the indicia **1, 2, 3,** respectively, said second annular band segment being completely disposed closer to said center than that of the entire of said first radial distance range of said first annular band from said center,

weekday indicia letters for 4 weeks disposed circularly on said week disk arranged to radially correspond with said date indicia on said date disk,

one of said disks being formed with a window delineation area spaced at another radial distance from said center of said one disk,

the other of said disks having 12 month indicia means annularly disposed and spaced angularly from one another and at a radial distance from said center of said other disk equal to said another radial distance and arranged for corresponding said date indicia with said weekday indicia letters for the particular one-year and for any particular month, when one of the month indicia means corresponding to said particular month is aligned with said window delineation area,

said week disk being further formed with a plurality of end-of-month-day opaque area means arranged in predetermined angular positions corresponding to and relative to said month indicia means for bringing only certain of said date indicia **29, 30, 31** into visible condition and for blocking out remaining of the latter corresponding to those of said particular month then aligned in said window delineation area, said plurality of end-of-month-day opaque area means being disposed at spaced angular positions defining another annular band segment, the latter disposed at a radial distance from the center of said week disk equal to that of said second annular band segment of the date indicia **29, 30, 31** from said center of said date disk.

4,026,053

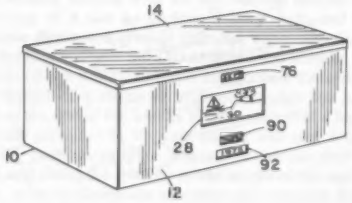
AUTOMATIC ILLUMINATING CALENDAR

Carl E. Canon, 3716 36th St., San Diego, Calif. 92104

Continuation-in-part of Ser. No. 500,276, Aug. 26, 1974, abandoned. This application Dec. 11, 1975, Ser. No. 639,792

Int. Cl.² G09F *11/24*

U.S. Cl. 40—117 **4 Claims**



1. An automatic calendar comprising:

a. a housing having a front panel with a window defined therein;

b. a first film strip having consecutive frames indicating sequentially the month dates of the year and each frame including an illustration;

c. guide means holding a portion of said film strip behind said front panel adjacent said window;

d. means for automatically advancing said film strip through said guide means every twenty-four hours to expose a sequential frame of said film through said window;

e. a second window disposed in said front panel;

f. a second film strip having consecutive frames displaying in order the names of the months of the year and means mounted in said housing for supporting said second film strip adjacent said second window and permitting said second film strip to be advanced to display sequential months through said window; and

g. means on said first film strip to advance said second film strip when said first film strip reaches the last day of each month displayed thereon.

4,026,054
LASER AIMING SYSTEM FOR WEAPONS

Wesley L. Snyder, 8709 Robindell, Houston, Tex. 77036

Filed Feb. 2, 1976, Ser. No. 654,202
Int. Cl.² F41G 1/34
U.S. Cl. 42—1 A 10 Claims

1. An aiming system for attachment to a weapon having an elongate barrel which comprises:

a laser for projecting a beam of coherent light onto a target to indicate the impact point of a projectile fired from the weapon; and

apparatus mounting said laser on said weapon in a manner such that the laser is free for limited longitudinal movement relative to the weapon generally parallel to said barrel,

said apparatus including a pneumatic buffer device for cushioning said laser from shock upon recoil of the weapon, which comprises

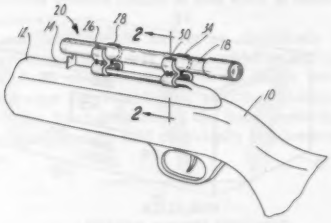
a cylinder held in fixed relation to the aiming device, and

a piston disposed within said cylinder for longitudinal movement therein, said piston being operably connected to said weapon and having a valve mechanism operable in response to fluid pressure within the cylinder.

4,026,055
TELESCOPIC SIGHT MOUNTING

Gerald T. Weast, 23702 Crossley, Hazel Park, Mich. 48050

Filed Apr. 9, 1976, Ser. No. 675,289
Int. Cl.² F41G 1/38
U.S. Cl. 42—1 ST 9 Claims



1. In combination with a firearm having an iron sight mounted on an elongated barrel:

a telescopic sight;

base means mounted on the firearm and having a pair of spaced grooves disposed parallel to the firearm barrel;

a unitary first mounting member having an upper wall, a lower wall, and a midsection integrally connected to said walls;

a unitary second mounting member having an upper wall, a lower wall, and a midsection integrally connected to said walls;

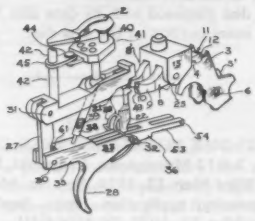
the lower wall of the first mounting member and the lower wall of the second mounting member being engageable in the grooves of the base means in a position in which the upper walls of the first mounting member and the second mounting member cooperate in a spaced relationship to support the telescopic sight in a supported position between said upper walls substantially parallel to the firearm barrel;

fastener means connecting the midsection of the first mounting member to the midsection of the second mounting member so as to be operative to move the upper wall of the first mounting member toward the upper wall of the second mounting member to engage opposite sides of the telescopic sight in said supported position as the lower wall of the first mounting member is being moved toward the lower wall of the second mounting member to clampingly engage the grooves of the base means between the lower edges of said lower walls, whereby when the sight is in said supported position, the fastener means are disposed between the telescopic sight and the base means, and the lower wall of the first mounting member and the lower wall of the second mounting member define an opening permitting the user to view the iron sight along a line of sight between the base means and the fastener means.

4,026,056
TRIGGER RELEASE MECHANISM

Gary W. Roman, 9709 Cedar Lake Drive, Louisville, Ky. 40291

Filed Mar. 22, 1976, Ser. No. 669,322
Int. Cl.² F41C 19/00
U.S. Cl. 42—69 R 5 Claims



1. A trigger mechanism, for use with a firearm device, having a breech, a pull trigger, said trigger having an elongated base, a firing pin disposed on said breech, hammer means for striking said pin, an overhead sear, said sear having a hammer engaging end and a trigger actuated end and being pivotably mounted for overhead engagement of said hammer engaging end with said hammer, a trigger actuated linkage in operative relation with said pull trigger for moving the trigger actuated end of said overhead sear downwardly and simultaneously raising said hammer engaging end of said sear upwardly and out of engagement with said hammer;

the improvement in said trigger release mechanism, which comprises,

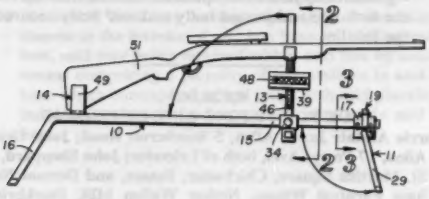
A. pivot means for said pull trigger, said pivot means being operatively connected to the front portion of said elongated base of said trigger for raising the rear portion of said trigger base upwardly and forwardly responsive to application of pressure on said trigger and for moving said trigger actuated linkage upwardly and forwardly for engagement with said trigger actuated end of said sear; and

B. a spring-loaded plunger, mounted in operative relation with said rear portion of said elongated base of said trigger and responsive to movement of said trigger for:

1. absorbing the potential energy caused by the upward movement of said trigger base upon application of finger pressure to said trigger, and

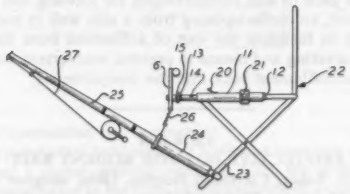
2. for releasing kinetic energy upon release of pressure on said trigger to provide downward thrust against said trigger base and said trigger actuated linkage and to push the trigger actuated end of said sear downwardly so as to raise the hammer engaging end of said sear out of engagement with said hammer.

4,026,057
SHOOTING SUPPORT FOR RIFLE
Wayne A. Cady, R.R. No. 1, Box 1864, Libby, Mont. 59923
Filed Mar. 8, 1976, Ser. No. 664,642
Int. Cl.² F41C 29/00
U.S. Cl. 42—94 4 Claims



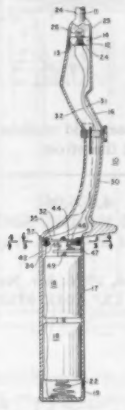
1. A rifle support comprising, in combination
an elongate body having a straight medial-forward portion and a rearward portion downturned to form a rear leg;
a U-shaped forward leg element having downturned end portions forming opposed cooperating front legs adjustably swivelly mounted by a forward leg connector upon the forward part of the body;
a forward cradle structure adjustably supported by the medial part of the straight body portion at a spaced distance thereabove and adjustably movable by manual manipulation to pre-determined positions along said body and vertically thereabove; and
a rearward cradle carried by the rearward portion of the body at a spaced distance thereabove.

4,026,058
FISH HOOK SETTER
Henry H. Harris, South Orange, N.J., assignor to Elizabeth Clark, Newark, N.J.
Filed June 11, 1976, Ser. No. 695,141
Int. Cl.² A01K 97/00
U.S. Cl. 43—15 1 Claim



1. A manually releasable fish-hook setter comprising:
a. a tube,
b. a sleeve slidable out of the tube,
c. a spring attached at one end to the end of the tube,
d. the other end of the spring attached to the sleeve,
e. the spring normally urging the sleeve into the tube,
f. a handle attached to the sleeve whereby the spring may be overcome and the sleeve slidably extended out of the tube,
g. the tube rigidly attached to a seat,
h. a fishing pole holder pivotably attached to the seat,
i. a spring connected between the holder and the handle,
j. an orifice in the tube,
k. an orifice in the sleeve,
l. the orifices in general registration with each other when the sleeve is extended out of the tube,
m. a spring-loaded knob in the sleeve movable into the orifices when in registration with each other, to lock the sleeve in extended position,
n. a spring-loaded button in the tube deflectable to enter the orifices and displace the knob, whereby the sleeve is released and moves back into the tube.

4,026,059
LIGHTED FISHING ROD
William R. Ochs, 15523 Clifton Blvd., Lakewood, Ohio 44107
Filed Sept. 29, 1975, Ser. No. 617,288
Int. Cl.² A01K 87/00
U.S. Cl. 43—17.5 1 Claim

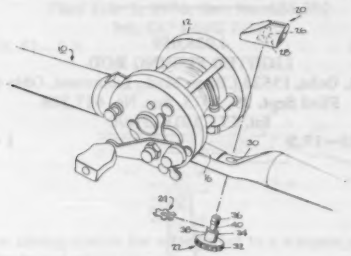


1. A fishing pole fitted with a rod section detachably joined to a hollow handle section,
said rod section formed of light transmitting compacted glass fibres,
said handle section fitted internally with a battery joined by switching means to a lamp bulb socket mounted at an end of the handle section, a surface of the wall of said end of the handle section formed in the shape of a screw thread,
said rod section formed with an end section shaped as a hollow cap of a size to enclose a lamp bulb and of a transverse dimension greater than the transverse diameter of the remainder of the said attached rod section, with a surface of the wall of said rod end section formed as a screw thread of a shape to matingly engage the screw thread of the end of the handle section such that a lighted lamp bulb mounted in the said socket will cast a beam extending both through the interior of the attached rod section and about the exterior of the length of the said rod section, so as to illuminate an externally attached fishing line.

4,026,060
LOCK FASTENER FOR A FISHING REEL
Richard D. Barnes, Costa Mesa, Calif., assignor to Garcia Corporation, Teaneck, N.J.
Filed Jan. 30, 1976, Ser. No. 654,053
Int. Cl.² A01K 87/06
U.S. Cl. 43—22 7 Claims

1. In combination, a fishing rod and a lock fastener for securing a fishing reel to said rod, said lock fastener comprising a reel retainer element constructed and arranged to engage the foot of a reel when said reel is positioned on said rod, said element having a threaded bore formed therein; an elongated screw having a head and a shank, said shank including a threaded tip and a recessed area adjacent said threaded tip, said screw being dimensioned to extend through a bore formed in the rod and into threaded engagement with said retainer element, and means positioned between said retainer element and said rod in association with the recessed area of said shank to permit only partial withdrawal of said screw

from said retainer element once said fastener has been tightened, whereby said lock fastener may be partially loosened to

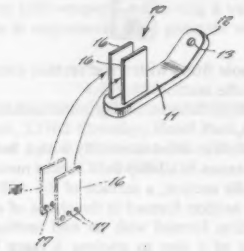


position a reel foot between said retainer element and said rod or to remove a reel foot therefrom.

4,026,061
RISING WINGED SINKER

Samuel E. Schuman, 831 El Cerrito Way No. 2, Gilroy, Calif. 95020

Filed Mar. 24, 1976, Ser. No. 669,717
Int. Cl.² A01K *95/00*
U.S. Cl. 43—43.13 **4 Claims**

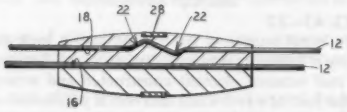


1. A rising winged sinker, comprising in combination, an elongated main body, a pair of wings secured to said main body, and a forward end of said main body extending angularly, respective to a rear portion of said main body, said angularly forward portion of said main body and said wings providing a means for said sinker to rise upwardly upon a moderate fast retrieving action of a fishing line.

4,026,062
FISHING LINE SINKER

Thomas P. Mosley, and Julio Dominguez, both of 140 NE. 163rd St., N. Miami Beach, Fla. 33162

Filed Apr. 9, 1976, Ser. No. 675,311
Int. Cl.² A01K *95/00*
U.S. Cl. 43—44.87 **6 Claims**

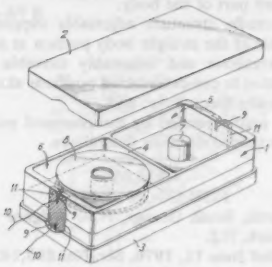


1. A fish line sinker comprising:
an elongated relatively heavy body having a pair of bores extending longitudinally therethrough, one of said bores being dimensioned to slidably retain a fish line positioned therein and the other of said bores being dimensioned to clamp a fish line positioned therein and thereby prevent longitudinal movement of the fish line, a first of said bores being coaxial with the longitudinal axis of said body and the other of said bores being located along the radial line at which said body is separable;
said body being radially slit to permit separation thereof for the positioning of a fish line in one of said bores;
and means releasably secured to said sinker body for retaining said body in a non-separated state to thereby retain the fush line within said body and said body secured to the fish line.

4,026,063
PACK FOR FISHING LINE DISPENSING

Barrie Alistair James Allen, 5 Beechcroft Road; John Grimes Allen, 17 Powys Ave., both of Leicester; John Sheppard, 21, St. Martins Square, Chichester, Sussex, and Dermot Needham Furnival Wilson, Nether Wallop Mill, Stockbridge, Hampshire, all of England

Filed June 1, 1976, Ser. No. 691,872
Claims priority, application United Kingdom, Feb. 24, 1976, 7170/76
Int. Cl.² A01K *97/00*
U.S. Cl. 43—54.5 R **6 Claims**

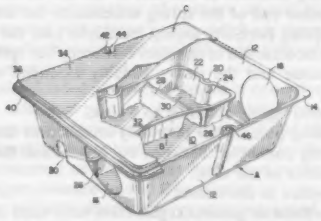


1. A pack for a plurality of wound spools comprising a housing which defines a plurality of spool compartments, means in each of said compartments for locating and mounting a spool, an outlet opening from a side wall in each compartment to facilitate the exit of a filament from the spool prior to severing and means to prevent inadvertent withdrawl of the monofilament back into the compartment.

4,026,064
PROTECTIVE BOX FOR RODENT BAIT

Stanley Z. Baker, Cleveland Heights, Ohio, assignor to J. T. Eaton Company, Cleveland, Ohio

Filed May 17, 1976, Ser. No. 686,794
Int. Cl.² A01M *25/00*
U.S. Cl. 43—131 **6 Claims**



1. A rodent bait protection box comprising a one piece metal box base portion having a bottom and a plurality of side walls defining an interior thereof;

a metal lid for covering said box base portion and having a peripheral edge portion and a downwardly extending overhang portion around said edge portions to extend beyond a corresponding tip portion on the top peripheral edges of said side walls of said box base;

at least one access hole disposed in at least one of said side walls of said body portion and located thereon a distance above the bottom of said box base portion and

a removable feed tray having a plurality of indentations therein in the interior of said box base for holding rodent bait, said tray being retained within said box by retainer means comprising a plurality of indentations in said box base which correspond to and coact with said plurality of indentations in said feed tray when installed in said box base.

4,026,065

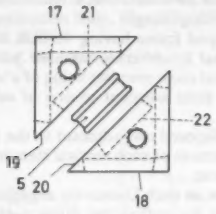
POLYHEDRAL ELEMENTS WITH UNDERCUT RECESSES AND CYLINDRICAL CONNECTORS HAVING COLLARS

Walter Dick, 30 Bahnofstrasse, 5908 Neunkirchen, Germany

Continuation of Ser. No. 538,798, Jan. 6, 1975, which is a continuation of Ser. No. 398,160, Sept. 17, 1973, which is a continuation of Ser. No. 234,088, March 13, 1972, abandoned. This application Nov. 14, 1975, Ser. No. 631,812

Int. Cl.² A63H *33/08*

U.S. Cl. 46—25 **3 Claims**



1. Construction toy, comprising

a. a polyhedral base element having at least one plane face and a recess opening onto the face, the surface of the recess being in the form of the frustrum of a cone with the larger diameter located inwardly of the face, the depth of the recess being substantially less than said diameter, and a bore leaving the center of the bottom of the recess and extending through the base element, the said surface of the recess extending completely from the said face to the said bottom, and

b. a connecting member consisting of a short cylindrical portion having a diameter less than the smallest diameter of the recess in the base element and an integral circumferential collar in the form of an annular surface, and a bore extending axially through the member, the diameter of the collar being greater than the lesser diameter of the recess said annular surface having means including rounded edges longitudinally of said cylindrical portion to co-act with said recess surface and aid movement of said collar into said recess, and

c. a second polyhedral base element with which the connecting member is connected, the cylindrical portion extending from a plane face thereof, the distance from the latter plane face to the outer end of the connecting member being less than the depth of the recess.

4,026,066

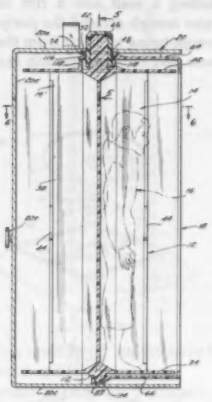
OPTICAL ILLUSION-PRODUCING ROTATING TOY

Lawrence L. Reiner, Woodbury, N.Y., and John P. McNett, Short Hills, N.J., assignors to Lawrence L. Reiner, Woodbury, N.Y.

Filed Sept. 18, 1975, Ser. No. 614,557

Int. Cl.² A63H *33/22*

U.S. Cl. 46—47 **51 Claims**



1. An optical illusion-producing rotating toy comprising support means; a generally elongate rotatable housing having an axis of rotation and mounted for free rotation on said support means; and latching means for selectively stopping said housing when the same is rotating in one of at least two angular positions thereof about said axis, said support member being structured to generally conceal said rotatable housing, while allowing it to be viewed from one point of observation, whereby said rotatable housing, when in a state of rotation, can be selectively stopped in one of said at least two angular positions by suitable actuation of said latching means to bring into view one of at least two corresponding different sides of said rotatable housing when viewing said toy from said one point of observation, said rotatable housing having sides and blending the sides thereof during rotation to make observation of any one individual side difficult until said rotatable housing has been stopped by said latching means, said latching means comprising engageable means on said rotatable housing which rotates in a circular path about said axis proximate to said support means with rotation of said rotatable housing; and at least two selection means on said support means each for engaging said engageable means and stopping the rotation of said rotatable housing in a respective associated angular position thereof about said axis, each of said selection means comprising a member mounted on said support means for movement between a first position for engagement with said engageable means, and a second position for disengagement from said engageable means, and resilient means for normally maintaining said member in said second position.

4,026,067

PLANT TURNTABLE

Sheldon M. Wengel, Reedsburg, Wis., assignor to Gerber Products Company, Fremont, Mich.

Filed Oct. 31, 1975, Ser. No. 627,814

Int. Cl.² A47G *7/02;* **A01G** *9/04*

U.S. Cl. 47—39 **2 Claims**

1. A plant turntable having power means for the rotation of a potted plant comprising:

a hollow base having an interior with a chamber and an exterior;

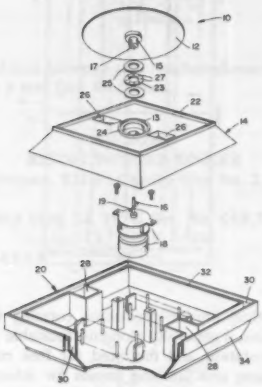
a base top removably supported upon said base for accessing said interior;

a disc for the support of a potted plant;

bearing means for rotatably supporting said disc upon said base top;

a geared motor mounted to said base within said interior chamber and coupled to a power source, said geared motor having a shaft extending vertically upward from said base and removably coupled to said disc for rotating said disc;

said base including a wall and a rim adjacent said wall defining a water trough around the periphery of said base, said water trough being isolated from the remaining interior of said base and hidden beneath said base top;



a base top having therein an opening for said shaft, a first raised ridge around said bearing means to minimize the possibility of liquid overflow into said shaft opening, and a second ridge around said first raised ridge located around the periphery of said base top defining a reservoir for capturing liquid from the rotated potted plant; and

drainage means within said reservoir below said disc and in said base top for directing liquid flow into said water trough; said disc being non-perforate and said second ridge being disposed outside of the radius of said disc for retaining liquid overflow from the margins of said disc.

4,026,068

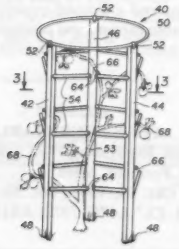
SUPPORT FOR A TOMATO PLANT

Seymour Tepper, 2000 Lilac Drive, Westbury, N.Y. 11590

Filed Dec. 8, 1975, Ser. No. 638,557

Int. Cl.² A01G *9/12*

U.S. Cl. 47—45 **1 Claim**



1. A support for the tomato-laden vines of a tomato plant comprising three parallel upright supports circumferentially spaced in facing relation to each other so as to bound a centrally located growing area for a tomato plant, a ring member attached in interconnecting relation adjacent the upper ends of said upright supports, and means for adjustably supporting said tomato-laden vines so that a vine may be relocated from one elevation to a different elevation, said means consisting of supporting members attached to each of said upright supports in a cantilever manner with the free ends being slightly raised and extending so as to substantially bound said growing area, the supporting members of adjacent upright supports extending substantially towards each other and being of such a length that a gap is defined between their free ends, said gap enabling relocation of a vine from one support to another support at a different elevation.

4,026,069

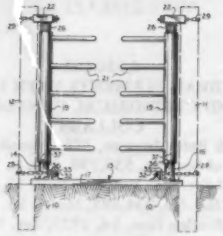
TURNSTILE ASSEMBLY

Floyd Newell Bohnett, P.O. Box 1536, Kailua, Kona, Hawaii 96740

Filed Mar. 25, 1976, Ser. No. 670,188

Int. Cl.² E01F *13/00*

U.S. Cl. 49—49 **3 Claims**



1. A prefabricated and portable turnstile assembly for livestock that can be inserted in a fence line having two spaced fence posts comprising:

a. a U-shaped frame having vertical stems and a generally horizontal lower cross member joining the stems, said horizontal cross member being of a length to dispose each vertical stem adjacent to one of said two spaced fence posts;

b. yokes disposed one adjacent to the top and one adjacent to the bottom of each vertical stem to engage the adjacent fence post;

c. fasteners on each U-stem for engaging said adjacent fence post and for pulling the fence post against the yoke to thereby secure the U-frame to the two fence posts;

d. at least one generally vertical rotatable tubular shaft fitting over at least one of the stems of the U-shape and supported on the U-frame;

e. at least one arm projecting from said rotatable shaft;

f. and means for normally biasing the shaft to dispose the arm across the space between the two stems of the U-shape, to give rise to a turnstile action.

4,026,070

ADJUSTABLE DOOR

Harry H. Hicks, 1599 Knollstone, Ferguson, Mo.

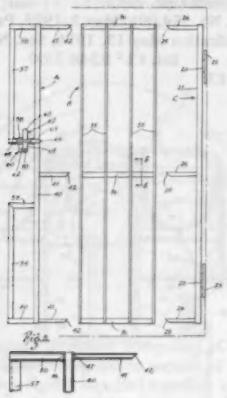
Filed Mar. 31, 1975, Ser. No. 563,314

Int. Cl.² E06B *9/06*

U.S. Cl. 49—55 **11 Claims**

1. A security barrier adapted to fit and render secure passageways of a variety of sizes comprising a plurality of barrier elements forming a grid type structure, means to fasten the barrier elements in a secure access-barring relationship to the passageway, adjustment means for adjustment of the barrier elements relative to each other and to the passageway to allow fitting of the barrier to the passageway, and means for fixing of the elements together in adjusted positions relative to each other to form a rigid barrier of a suitable size for the passageway, the fastening means and the fixing means being accessi-

ble when the barrier is in non-access-barring relationship to the passageway, means rendering the fastening means inaccessible when the barrier is in an access-barring relationship to



the passageway, and means rendering the fixing means inaccessible when the barrier is in an access-barring relationship to the passageway.

4,026,071

WINDOW REGULATORS, ESPECIALLY FOR VEHICLE WINDOWS

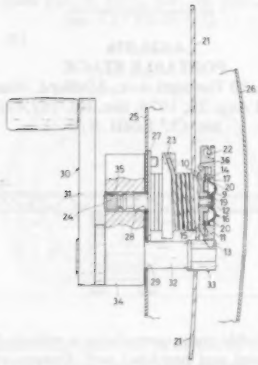
Terenzio Sessa, Via Albani 5, Varese, Italy

Filed Feb. 27, 1976, Ser. No. 661,969

Claims priority, application Italy, Mar. 13, 1975, 21244/75; Brazil, May 28, 1975, 03387

Int. Cl.² E05F *11/48*

U.S. Cl. 49—352 **6 Claims**



1. In a window regulator device, especially for windows of vehicle doors, of the kind having a window-operating cable attached at one end to a winding drum mounted inside a vehicle door on a shaft which drives the drum selectively in opposite directions, and attached at its opposite end to a wheel which is rotatably mounted on said shaft adjacent said drum and is operatively connected by a unidirectional clutch to said drum, the improvement comprising

crenellated means on said wheel registering with an opening in one side of said door and engageable by a tool, which is insertable through said opening from outside the door, and which is operable to rotate the wheel relative to the drum.

4,026,072

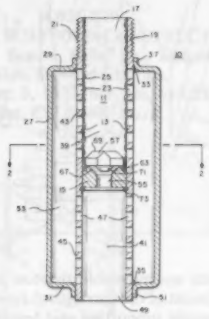
SELF-CLEANING MUFFLER FOR AN ABRASIVE BLAST SYSTEM

George H. Dremann, 1490 Hopkins St., Berkeley, Calif. 94707

Filed Aug. 9, 1976, Ser. No. 712,592

Int. Cl.² B24C *7/00*

U.S. Cl. 181—36 A **10 Claims**



1. A self-cleaning muffler for an abrasive blast system having an exhaust outlet means comprising

a chamber element having side walls, an end wall, and at least one inlet portion opposite said end wall,

means for fluidly connecting the inlet portion of said chamber element to the exhaust outlet means of said abrasive blast system such that when said abrasive blast system is depressurized the exhaust emitted through said exhaust outlet means is directed into said chamber element toward said end wall,

perforation means in said chamber element side walls for permitting the gaseous media of said exhaust to escape from said chamber element, but for preventing particulate media from passing therethrough,

a particulate media outlet means located in said chamber element's end wall, and

means for closing said particulate media outlet means by the kinetic force of the exhaust directed through said inlet means from said abrasive blast system, and opeing said paticulate media outlet means in the absence of said exhaust whereby exhausted particulate media is trapped in said chamber element until the abrasive blast system is substantially depressurized at which time the particulate media falls by gravity out of said chamber element.

4,026,073

TOOL GRINDING MACHINE

Otto Betzler, Tauberbischofsheim, Germany, assignor to Michael Weinig KG, Tauberbischofsheim, Germany

Filed Nov. 12, 1975, Ser. No. 631,381

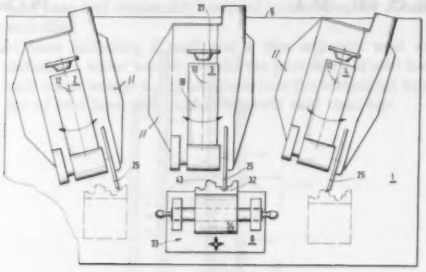
Claims priority, application Germany, Aug. 30, 1975, 2538737

Int. Cl.² B24B *3/08*

U.S. Cl. 51—100 R **13 Claims**

1. In a tool grinding machine, especially for grinding profile cutters; a machine frame, workpiece support means mounted on said frame adapted for supporting a cutter with the edge to be ground exposed with the cutter in a predetermined plane, grinding wheel support means on the frame for rotatably supporting a grinding wheel on an axis of rotation for grinding the exposed edge of the cutter, and cooperating elements of template and follower means to control relative movement between the cutter and grinding wheel, said grinding wheel support comprising a first support member pivotal about a first axis on said frame which is transverse to the axis of rotation of the grinding wheel, a second support member mounted on said first support member for movement thereof about a

second axis which is parallel to the axis of the grinding wheel and near the peripheral region of the wheel which engages the cutter, said workpiece supporting means comprising at least three superposed relatively moveable carriages the lower one of which is moveable on said frame in one direction and the



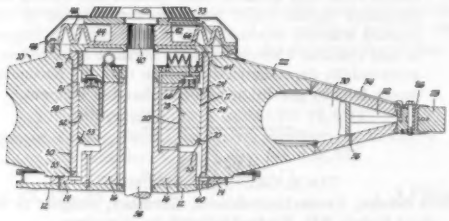
others of which are moveable thereon in relative directions with the uppermost of the carriages supporting the cutter to be ground, and means supporting said template and follower for adjustment thereof relatively independantly of said workpiece support means and grinding wheel support means.

4,026,074

GRINDING WHEEL TUBULAR SUPPORT FOR RADIAL EXPANSION THEREOF

William F. Dais, Utica, and Antoni J. Malarz, Warren, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed June 4, 1976, Ser. No. 692,974
Int. Cl.² B24B *41/04*
U.S. Cl. 51—168 **1 Claim**



1. In a grinding wheel assembly of the type having a massive rotating grindir.g wheel with an axial bore surface defining an axial bore and being subject to radial expansion during grinding wheel rotation, the assembly further having means for rotatably supporting and driving the grinding wheel including bearing means within the axial bore, the improvement comprising:

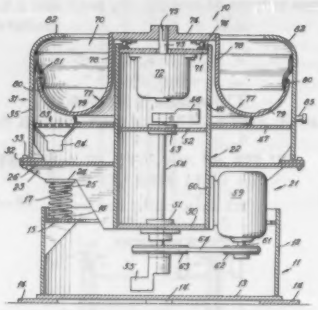
a tubular support member in the axial bore for supporting the grinding wheel on the bearing means, the tubular support member surrounding the bearing means and having an inner radial surface, the axially central portion of which engages the bearing means, the tubular support member further having a radially outer surface, the axially central portion of which is spaced from the axial bore and the axial ends of which are shrunk-fit into compressed engagement with the axial bore surface to expand and thus maintain engagement therewith as the axial bore expands during grinding wheel rotation.

4,026,075

FINISHING METHOD WITH GYRATIONAL AND ROTATIONAL MOTION-PRODUCING COMPONENTS

Gunther W. Balz, Kalamazoo, Mich., assignor to Roto-Finish Company, Kalamazoo, Mich.

Division of Ser. No. 574,001, May 2, 1975, Pat. No. 3,990,188.
This application May 13, 1976, Ser. No. 685,744
Int. Cl.² B24B *1/00*
U.S. Cl. 51—313 **5 Claims**



1. A process for finishing a part which comprises:

a. maintaining said part and a finishing material in an annular finishing chamber comprising members, one of which is rotatable with respect to the other,

b. rotating one of said rotatable members relative to the other to cause said part and finishing material to revolve and to move continually alternately between said rotating member and said other member for finishing said part,

c. applying gyrational motion to said finishing chamber to cause said part and finishing material to move forward with precessional motion within said chamber, and

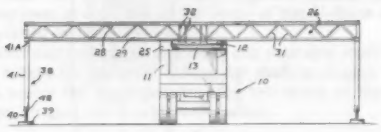
d. separating said finishing material from said part and discharging said part.

4,026,076

PORTABLE STAGE

Joseph Analetto, 10 Farragut Ave., Medford, Mass. 02155

Filed Aug. 25, 1976, Ser. No. 717,499
Int. Cl.² E04H *3/10*
U.S. Cl. 52—6 **12 Claims**



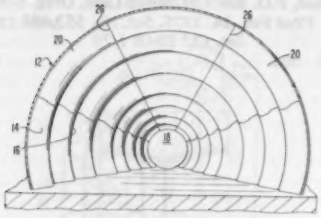
1. A transportable stage comprising a vehicle dimensioned for highway travel and provided with framework extending lengthwise thereof, a turntable supported by said framework located between the ends thereof, tracks extending from said turntable towards both ends of the framework and supported thereby, a series of joists of a length greater than the width of the vehicle, each joist including a carriage adapted to travel along said tracks, and said turntable including carriage storage means dimensioned to accommodate all of said carriages side-by-side, said turntable having first and second positions of use in the first of which said joists when on the turntable are lengthwise of the vehicle and in the second of which said joists are transversely thereof, said carriages then positioned for engagement with and movable along said tracks, some forwardly and some rearwardly of said turntable into predetermined positions and floor units supported by said joists.

4,026,077

EXOSKELETAL STRUCTURE AND METHODS FOR ITS CONSTRUCTION

Edwin Charles Pickett, P.O. Box 764, Marshall, Calif. 94940

Filed June 11, 1975, Ser. No. 586,016
Int. Cl.² E04B 1/32
U.S. Cl. 52—80 6 Claims



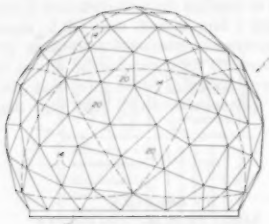
1. A self-supporting structure comprised of a plurality of rigid, corrugated surface convoluted sectors of a hypothetical surface of revolution rigidly attached together at their longitudinal edges, the convolutions being continuous and symmetrical about one axis of the structure and wherein the corrugated surface of the sectors comprises alternately convex and concave convolutions extending widthwise of the structure and with the concave convolutions being a constant, predetermined fraction of the diameter of the convex convolutions and the convolutions diminishing in diameter progressively by a fixed percent in the direction from the middle of the building toward its ends.

4,026,078

SPHERICAL STRUCTURAL ARRANGEMENT

William W. Ahern, Belmont, and Birgit T. Mathe, Cambridge, both of Mass., assignors to GeoMetrics, Cambridge, Mass.

Filed Feb. 9, 1976, Ser. No. 656,340
Int. Cl.² E04B 1/32
U.S. Cl. 52—81 8 Claims



1. A self-supporting spherical structure of elongated structural elements arranged in reoccurring geometric patterns, the elements in each of said patterns cooperating to define a plurality of four basic triangular openings, said elements having four basic lengths which are utilized repeatedly in said pattern, the elements defining said triangular openings being interconnected in a standard random pattern, each of said standard patterns being comprised in part of:

three isosceles triangles (A) each havinga vertex (23), equal side elements (22) and a base element (24), each of said vertices (23) being located at one of the vertices (X, X′, X″) of an imaginary spherical triangular subdivision (16) having sides (20);

three equilateral triangles (B) each having side elements (24) equal in length to the base element (24) of said isosceles triangles (A), said equilateral triangles (B) each having one side element (24) parallel to the base element (24) of one of said isosceles triangles (A); and

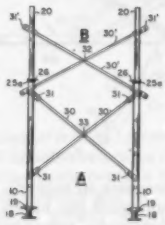
a fourth equilateral triangle (B′) identical to said equilateral triangles (B), said fourth equilateral triangle having each of its vertices (27′) common to one vertex (27) of one of said equilateral triangles (B).

4,026,079

SHORING SCAFFOLD CONSTRUCTION

Ronald G. Morris, Beaver Falls, Pa., assignor to Beaver-Advance Corporation, Ellwood City, Pa.

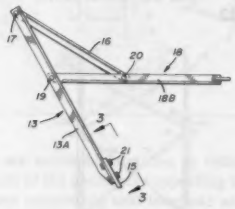
Filed Oct. 3, 1975, Ser. No. 619,529
Int. Cl.² E04H 12/18
U.S. Cl. 52—122 4 Claims



2. In an adjustable heighth high-rise scaffold assembly having upper and lower main sections of substantially the same construction, each section being provided by a pair of opposed spaced-apart integral end frames, each end frame being substantially planar and having a pair of spaced-apart tubular upright main side legs, the main side legs of end frames of the upper section having a telescopically interfitting relation with the main side legs of the end frames of the lower section and having vertically spaced-apart latching hole portions and cooperating latching pin means for adjusting their heights with respect to aligned main side legs of the end frames of the lower section, the improvement comprising, a pair of vertically spaced-apart horizontally cross-extending strut members integrally secured between upper end portions of the pair of main side legs of each end frame of both the upper and lower sections, said pairs of strut members defining a substantially planar rectangular-shaped integral upper end portion of each upper and lower section, a pair of shorter length secondary legs positioned in a slightly horizontally inwardly spaced relation with respect to the pair of main side legs of and integrally secured to and extending vertically across between said pair of cross-extending strut members of each end frame of both the upper and lower sections, a latch pin integrally carried by each said secondary leg of each said pair and extending outwardly therefrom in an opposite direction with respect to the latch pin of the other secondary leg of each said pair and within the spacing between each said secondary leg and an adjacent main leg of each end frame of both the upper and lower sections, tubular brace members of a standard length having flattened opposite ends provided with latching hole portions for detachably cooperating with said latch pins of said secondary legs to diagonally cross-connect each end frame of the upper section with an opposite end frame of the lower section, each of said brace members having at least one flattened end thereof provided with a group of longitudinally spaced-apart latching hole portions whose spaced relation is proportioned on a diagonal basis to the vertically spaced relation between the latching hole portions in the main side legs of the end frames of the upper section, whereby said brace members may be accommodated to vertical heighth adjustments of the main side legs of the upper section in their telescopic relation with aligned main side legs of the lower section, said latch pins of the upper and lower end frames that are connected together by the same diagonal brace members extending in the same direction within the plane of their respective end frames, whereby each

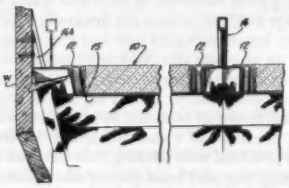
of said brace members may be inserted on and removed from cooperating pairs of said latch pins within the spacing between adjacent main and secondary legs of the end frames of the upper and lower sections.

4,026,080
FIELD ANCHOR
Lee B. Meikle, Rte. 1, Box 49, Fowler, Ohio 44418
Filed May 12, 1976, Ser. No. 685,622
Int. Cl.² E02D 5/74
U.S. Cl. 52—159 **5 Claims**



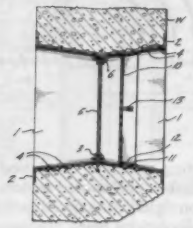
1. A field anchor comprising an angularly disposed ground engaging post and a horizontal bar having one of its ends attached to said post substantially midway between the ends of the post, said post and said bar each formed of a pair of spaced parallel angle members, coupling means on the other end of said horizontal bar for the reception of a cable and a compression brace positioned between the uppermost end of the post and the middle portion of the horizontal bar, the lower end of the post having a pointed configuration and a plate positioned transversely thereof, fasteners joining said plate and said angle members of said post, portions of said one end of said horizontal bar and one end of said compression brace positioned between said angle members of said post and fasteners attaching the same thereto.

4,026,081
SUSPENDED CEILING PANEL
Leo L. Delaney, Pierrefonds, and Harold Barker, Montreal, both of Canada, assignors to Aluflex Partitions (Eastern 1970) Ltd., St. Leonard, Canada
Filed May 26, 1976, Ser. No. 690,195
Int. Cl.² E04B 1/82
U.S. Cl. 52—222 **3 Claims**



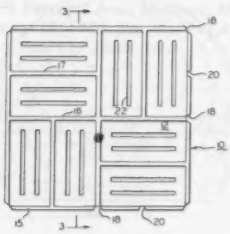
1. An acoustical ceiling panel comprising an acoustical insulating fiber panel having two pairs of parallel edges, elongated framing members extending along the edges of the panel, each framing member being rigid and including a first web portion adapted to engage the edge of the panel, a first flange at right angles to the web for engaging suspension hanger-flanges, a second flange extending as a projection of the lower surface of the panel and extending a short distance beyond the projection of the first flange, the second flange having further flanges extending at 90° thereto forming a material receiving slot, an aesthetic covering material stretched across the lower surface of the acoustical fiber panel and engaging said material receiving slot on the second flange of the framing members, and locking means within the slot for holding the edges of the covering material in the slot.

4,026,082
VENT FRAMES
Percy Crofoot, P.O. Box 130, Silver Lake, Oreg. 97638
Filed Feb. 24, 1975, Ser. No. 552,438
Int. Cl.² E04B 1/70
U.S. Cl. 52—302 **8 Claims**



1. A sectional vent frame comprising a pair of identical hollow frame sections flared over substantially their entire widths, and joining means joining said frame sections in back-to-back adjacent relationship for cooperatively forming a passage therethrough and with each frame section flaring away from the other frame section.

4,026,083
BRICKWORK FORM
Peter B. Hoyt, Great Falls, Va., and Stephen V. C. Schuyler, Bethesda, Md., assignors to Betco Block & Products, Inc., Bethesda, Md.
Filed Apr. 29, 1976, Ser. No. 681,681
Int. Cl.² E04F 13/08; E04B 2/28
U.S. Cl. 52—387 **10 Claims**



1. A modular form for laying blocks in a desired pattern comprising:

a. a sheet of semi-rigid material including a raised peripheral rim and a plurality of dividers, said rim including two pairs or opposed parallel sides and square corners, said rim and said dividers being generally U shaped in cross-section and each being of substantially the same height, said height being less than the height of the blocks to be laid,

b. a plurality of block-shaped sections formed on said sheet by said rim and said dividers, said sections being arranged in said desired pattern, and

c. means on the rim of said sheet for permitting interlocking of a plurality of said forms to one another and for permitting continuation of said desired pattern between adjoining forms.

4,026,084

CONNECTION MEMBERS FOR CONSTRUCTIONAL SYSTEM

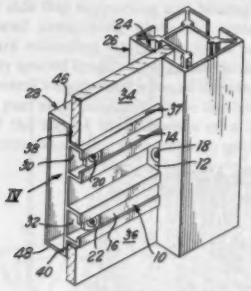
Alan Charles Goose, Sheffield, England, assignor to Aluminum Systems Limited, Sheffield, England

Filed Oct. 22, 1975, Ser. No. 624,890

Claims priority, application United Kingdom, Oct. 22, 1974, 45707/74

Int. Cl.² F16B *3/00*

U.S. Cl. 52—495 **12 Claims**



1. A constructional system for making joints between separate lengths which may be extruded which comprises a first length having an outwardly facing, open ended, undercut channel formation with a mouth along one face thereof, a second length having two such channels with mouths along one face thereof, a connection member having a base which is passable into an end of the channel formation along said one face of said first length and is of such form as to be prevented thereby from passing said channel mouth while movable to any desired position along the channel, securing means accessible for actuation through said mouth of said channel in said first length whereby the connection member may be secured by its base to said first length at said desired position therealong to project through said mouth of said channel in said first length, said connection member having a spaced pair of side members each extending along a respective one of a pair of parallel axes and passable in its axial direction into the end of a perspective one of the two channel formations along the said one face of said second length, each of said side members having a tapped hole therethrough inclined to the axis thereof in the direction of the base thereof, and a threaded member screwed into each such hole and accessible for actuation through said mouth of the associated channel in said second length whereby tightening of the threaded members draws the second length into rigid fixed relationship with said first length.

4,026,085

CONSTRUCTION SYSTEM

Harold Graves Simpson, Oklahoma City, Okla., assignor to Star Manufacturing Company, Oklahoma City, Okla.

Division of Ser. No. 336,364, Feb. 27, 1973. This application Feb. 4, 1974, Ser. No. 439,060

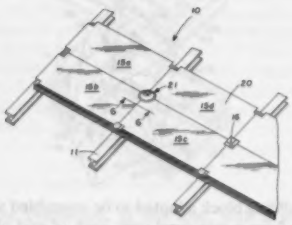
Int. Cl.² E04D *1/36*

U.S. Cl. 52—536 **3 Claims**

1. A waterproof membrane system comprising a plurality of waterproof, flexible membrane panels supported on a substantially continuous rigid substructure, the membrane panels being interconnected along watertight seams formed by overlapped adjacent edges of the panels such that a plurality of seams converge toward but stop short of a common point to form a watertight surface except for a passageway for fluids extending through the membrane system at the common point, and a sealing device sealing the passageway which comprises

a generally flat support surface disposed beneath the membrane panels and above the rigid substructure and underlying the end of each of the seams which converge at the passageway;

a sealing member disposed above the membrane panels and superimposed over the passageway, the sealing member having a peripheral edge seal extending continuously around the passageway and transversely across each of the seams and over the surface of the respective membrane panels between the seams, and



fastener means under tension extending between the sealing member and the substructure for clamping the membrane panels and edge seams between the peripheral edge seal of the sealing member and the flat support surface to thereby form an annular watertight seal between the sealing member and the membrane panels around the passageway and complete the continuous waterproof membrane system.

4,026,086

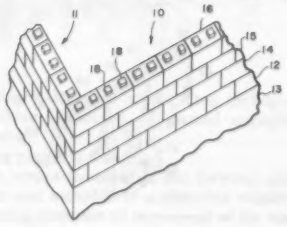
BUILDING BRICK

David T. Langley, 1836 W. Venango St., Philadelphia, Pa. 19140

Filed July 18, 1975, Ser. No. 597,267

Int. Cl.² E04C *1/10;* **A63H** *33/08;* **H01F** *7/02*

U.S. Cl. 52—582 **2 Claims**



1. A building brick used for constructing buildings, comprising:

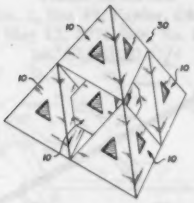
a clay building brick provided with two projecting locking members on a first surface and two locking indentations on a second surface opposite said first surface whereby said projecting locking members on a building brick in a first tier of bricks are adapted to fit into the indentations of one or more bricks in an adjacent tier of bricks; and

magnetic particles distributed inside said bricks underneath each of said projecting locking members and each of said locking indentations, and the magnetic particles underneath at least one of each of two adjacent bricks surfaces being permanently magnetized in order to provide a magnetic attraction force between bricks in adjacent tiers.

4,026,087
BUILDING BLOCK

Robert R. White, 2855 W. 22nd Ave., Vancouver, British Columbia, Canada (V6L 1M7)

Filed Apr. 20, 1976, Ser. No. 678,462
Int. Cl.² E04C 1/10
U.S. Cl. 52—608 5 Claims

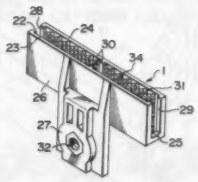


1. A building block adapted to be assembled with other such blocks to form a structural unit, each of said blocks comprising a hollow tetrahedron body having four identical side walls shaped as equilateral triangles, said side walls being interconnected along ridges which terminate at tips of substantially conical corners, each of the side walls having a central opening provided with side edges, said side edges of each opening defining an equilateral triangle and being equidistantly spaced from and disposed parallel to adjacent ridges, said corners each being enterable into an opening of an adjoining body to abut the side edges thereof, the relative sizes of the openings and the corners are such that the tip of a corner lodged in an opening of a vertically standing body is disposed at the vertical axis of said body.

4,026,088
WINDOW PANE HOLDER

Morizi Akabane, Atsugi, Japan, assignor to Hori Glass Co., Ltd., Japan

Filed Aug. 19, 1976, Ser. No. 715,828
Claims priority, application Japan, Aug. 20, 1975, 50-114734[U]
Int. Cl.² E05F 11/44
U.S. Cl. 52—628 2 Claims

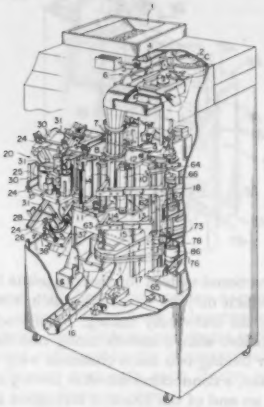


1. A window pane holder for use in providing a connection between a window pane of a vehicle and a window pane elevating unit which lifts and lowers the window pane; the holder being formed of a hard synthetic resin and comprising a framework having a pair of opposite sidewalls defining therebetween an elongated slot for receiving the window pane therein and a bottom, and an extension downwardly depending from the framework and including connection means with the elevating unit, the pair of sidewalls being provided with ribs thereon at least at their opposite ends, the ribs on one of the sidewalls being normal to a longitudinal axis of said slot and extending toward the other sidewall and bearing against the surface of the window pane as it is received into the slot, thereby forming a clearance between the sidewalls and the pane in the region intermediate the ribs so as to receive an adhesive therein.

4,026,089
DEVICE FOR SETTING OPERATION POSITION OF CRIMPING HOOK IN COIN WRAPPING MACHINE

Yasuo Murakami, and Hirokuni Matono, both of Himeji, Japan, assignors to Glory Kogyo Kabushiki Kaisha, Himeji, Japan

Filed Sept. 29, 1976, Ser. No. 727,867
Claims priority, application Japan, Sept. 30, 1975, 50-118128
Int. Cl.² B65B 57/02, 11/04
U.S. Cl. 53—77 1 Claim



1. In a coin wrapping machine of the type having coin wrapping means for wrapping a piece of wrapping paper around the cylindrical surface of each of successively arriving coin stacks each of a specific number of coins, the wrapping paper having a width greater than the length of the coin stack whereby lateral edges of the paper project outwardly beyond the ends of the coin stack, an edge fold crimping device including crimping hooks for fold crimping said projecting edges of the wrapping paper thereby to form a wrapped coin stack, and a wrapping paper storing device having a plurality of paper roll loading platforms for supporting thereon respective rolls of wrapping paper of respectively different widths corresponding to different heights of coin stacks and moving any of the platforms to a paper feeding position for unwinding and feeding the paper thereon to said coin wrapping means, a device for adjustably setting the operational position of at least one of the crimping hooks, said device comprising detection means for detecting the height of the paper roll on each loading platform, said detection means including a detection member undergoing a displacement in conformance with said height as detected by said detection mechanism, and a setting mechanism having a driven member engaged and driven by said detection member of a loading platform selected and moved to said paper feeding position thereby to set the operational position of said at least one crimping hook in conformance with the width of the wrapping paper on said loading platform.

4,026,090
MEANS IN AUTOMATIC CARTON CLOSING MACHINES TO SUPPORT UNDERSIDES OF DOWN-FOLDED TOP SIDE FLAPS DURING ANCHORAGE OPERATIONS

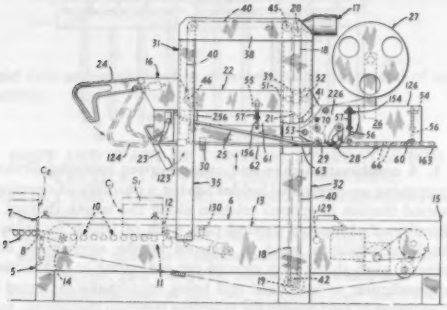
Winton Loveland, Fort Salonga, N.Y., assignor to The Loveshaw Corporation, Deer Park, N.Y.

Filed Feb. 6, 1976, Ser. No. 655,719
Int. Cl.² B65B 7/20
U.S. Cl. 53—374 11 Claims

1. In an automatic carton closing machine for folding down and inward upwardly-extending top end flaps and opposed

side flaps of cartons being transported longitudinally therethrough along a lateral path defined by a lateral machine base structure, the combination with a head for effecting the folding of such top flaps when in the vicinity of the top of such a carton and the latter passes forward along the carton lateral path with its opposite side flaps initially extending upwardly in unfolded positions, said head being elongated longitudinally in the direction of the carton lateral path with support thereby in longitudinal succession of both flap folding equipment and folded flap anchoring equipment, of

1. folded side flap supporting and biasing means carried by said head comprising elongated, relatively stiff plate structure extending laterally along a pair of appreciably laterally spaced longitudinal zones flanking opposite sides of a central longitudinal zone of appreciable width of the carton part at an elevation above the latter approximately that of the top of the sidewalls of a carton to be next transported along this path beneath said head with infolding by the latter of this carton's previously upstanding leading front and trailing back end flaps of certain width whereby these infolded end flaps travel immediately beneath such plate means which is of an overall width no greater than those folded end flaps,



2. means on said head to fold down and inward in opposite directions said upstanding side flaps over said elongated plate structure and the infolded end flaps immediately therebeneath with one of said folded side flaps lying above one of said flanking longitudianl zones and the other folded side flap lying above the other flanking longitudinal zone, and
3. folded flap anchoring equipment carried by said head forward of said flap folding means and in said central longitudinal zone of appreciable width with said side flap supporting plate structure extending forward along the path past said folded flap anchoring equipment whereby the infolded side flaps are supported thereby during anchoring of these side flaps.

4,026,091

ARTICLE HANDLING AND PLACEMENT APPARATUS

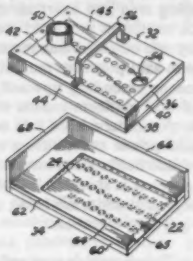
Walter G. Pearson, P.O. Box 5542, Alexandria, La. 71301

Filed Mar. 25, 1976, Ser. No. 670,510
Int. Cl.² B65B *67/02, 5/08*
U.S. Cl. 53—390 **2 Claims**

1. Apparatus for lifting a predetermined number of articles from a supply location and depositing them on a sheet-like receptacle containing a like number of article receiving sockets arranged in a predetermined array by creating a pressure differential across the articles, comprising:

generally flat base means having an upwardly open recess for receiving and horizontally supporting said sheet-like receptacle therein and having at least two upstanding cooperating guide walls spaced outwardly from the recess;

generally flat head assembly means including a box structure having a hollow interior forming a chamber and being in overlying registration with said base means when superposed thereon and in contact with said guide walls and having a generally flat top wall and flat bottom wall, said top wall having a port provided with a coupling communicating with the chamber; and,



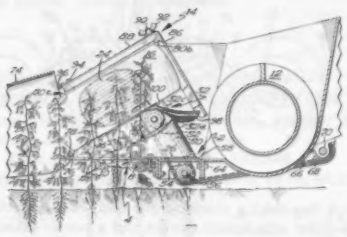
a flexible tube connected, at one end, with a source of vacuum and connected, at its other end, with said coupling, said bottom wall having a plurality of apertures providing communication between the chamber and the ambient air and being arranged in cooperative vertically spaced relation with respect to the receptacle sockets when said head assembly means overlies said base means.

4,026,092

ROW CROP HARVESTING APPARATUS

James F. Wehde, Garretson, S. Dak. 57030

Filed Dec. 12, 1975, Ser. No. 640,339
Int. Cl.² A01D *45/02*
U.S. Cl. 56—14.3 **25 Claims**



1. A harvesting attachment on the crop pickup end of a harvesting machine supported on ground engaging wheel means, comprising:

crop receiving platform means;

cutting blade means mounted at the forward end of said platform means and movable in a direction relative to the forward, harvesting direction of movement of the machine to sever crop stalks;

at least one pair of rotary gripping members of generally circular shape rotatably supported on axles on the forward end of said platform means, said gripping members being supported in an angularly inclined position with respect to the ground with the forward ends of said gripping members being lowermost, and said gripping members having yieldable, peripheral surfaces in pressure contact with each other along a contact and gripping area extending from a point forwardly of the cutting zone of said cutting blade means rearwardly to a point at least as far rearwardly as the rear end of said cutting zone in overlying relation thereto;

a low level drive shaft for said rotary gripping members extending transversely of said platform means adjacent the forward end thereof at a level below said pair of gripping members;

power input means for rotating said drive shaft; and

power transmitting means extending upwardly from said drive shaft to the axle of one of said gripping members thereby rotating together in opposite directions so as to grip the stalks of plants therebetween at the forward end of said gripping area and exert an upward and rearward pulling force on stalks and hold them for cutting from their roots by said cutting blade means prior to conveying the stalks onto said platform means; and

baffle plate means extending upwardly from adjacent the front end of said platform means to a position in close proximity to the underside of said rotary gripping members, and said power transmitting means being located forwardly of said baffle plate means, whereby said power transmitting means is shielded by said baffle plate means from crop segments and trash being carried rearwardly by said rotary gripping members.

4,026,093
HAY-RAKING MACHINE

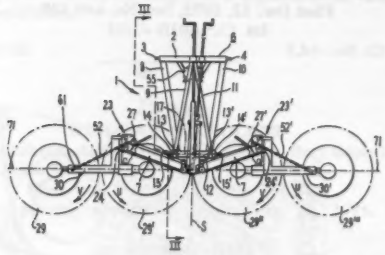
Gregor Knüsting, and Karl-Heinrich Ahrens, both of Lengede, Germany, assignors to Wilhelm Stoll Maschinenfabrik GmbH, Lengede, Broistedt, Germany

Continuation-in-part of Ser. No. 553,588, Feb. 27, 1975, abandoned. This application May 3, 1976, Ser. No. 682,679

Claims priority, application Germany, Mar. 5, 1974, 2410453

Int. Cl.² A01D *79/02*

U.S. Cl. 56—370 **15 Claims**



1. A hay-raking machine for use with a tractor having a three-point attachment device and a power takeoff, said machine including:

a main support frame carried by said three-point attachment device of said tractor and carrying support bearings each providing an approximately vertical pivot axis;

auxiliary frames each pivoted about a said support bearing axis on said main support frame;

means for securing each auxiliary frame in selected pivoted positions with respect to said main support frame;

toothed rotary rakes carried in groups on said auxiliary frames for rotation about generally vertical axes and ground engaging wheels on said auxiliary frames for at least in part supporting same, said auxiliary frames having at least one said position in which said wheels lie substantially on a common rotation axis;

drive means for rotatably driving said rotary rakes and including a a main drive unit drivable from the tractor;

said machine further including the improvement wherein:

said main support frame comprises a pull frame part and a support frame part, said pull frame part being carried by said three point attachment device on said tractor and said support frame part carrying said support bearings;

pivot joint means pivotally supporting said support frame part on said pull frame part and having a pivot axis lying substantially above said common rotation axis of said wheels and being parallel thereto, and adjusting spindle means actuable for adjusting said support frame part with respect to said pull frame part about said axis of said pivot joint means.

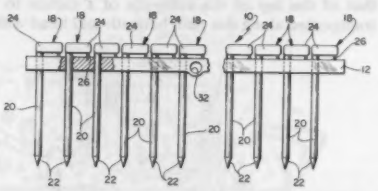
4,026,094
COMBINATION RAKE AND GROUND COVER RETAINING DEVICE

Stanley Sasur, 31 Meadow Ave., Cumberland, R.I. 02864

Filed Oct. 6, 1975, Ser. No. 620,013

Int. Cl.² A01D *7/06*

U.S. Cl. 56—400.04 **4 Claims**



1. A combination rake and ground cover retaining device, comprising an elongated holder having a plurality of openings formed therein in spaced relation along the length thereof, a plurality of elongated ground pins each of which includes a shank to which a head is secured at the uppermost end thereof, each shank of a ground pin extending in a direction perpendicular to said head and being frictionally mounted in an opening in said holder for selective removal therefrom, said ground pins cooperating with said holder to define a rake for preparing ground for receiving a ground cover thereon, a cover gripping pin secured to the underside of the head of each ground pin, each cover gripping pin being located in parallel relation to the shank of an adjacent ground pin and extending for only a portion of the length thereof, wherein the shank of each ground pin after removal from said holder is insertable into the ground adjacent to said ground cover, the head of each ground pin overlapping said ground cover and the cover gripping pins as secured to said heads extending into said ground cover and cooperating with the shanks of said ground pins to secure said ground cover to the ground, and a plurality of recesses formed in said holder in spaced relation to the holes formed therein and accommodating the ground cover gripping pins therein when the ground pins are mounted in the openings in said holder.

4,026,095
VARIABLE PASSAGE TYPE YARN GUIDE ARRANGEMENT

Takashi Kobatake; Kyosuke Takeda; Sadao Nishide, and Tetsuo Saito, all of Moriyama, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Oct. 16, 1975, Ser. No. 622,919

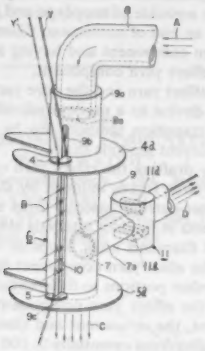
Claims priority, application Japan, Oct. 16, 1974, 49-118792; Oct. 16, 1974, 49-118793

Int. Cl.² D01H *9/02, 9/16*

U.S. Cl. 57—34.5 **5 Claims**

1. A yarn winding arrangement for a bobbin comprising a yarn sucking and projecting unit positioned at a distance substantially above said bobbin and in close proximity to the starting point of a yarn balloon, said unit including a first waste yarn sucking means for drawing a cut yarn end after the bobbin is filled and a fluid projection means for directing a cut

yarn end toward a bobbin and a second waste yarn sucking means adapted for receiving a yarn projected fluidically from



said unit and positioned in proximity of the root end of said bobbin.

4,026,096

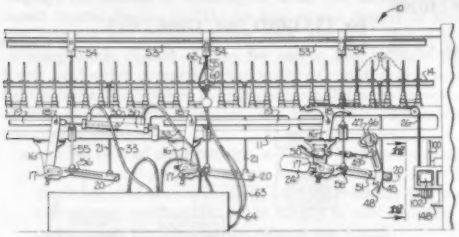
DOFF AND START-UP CONTROL APPARATUS FOR TEXTILE YARN PROCESSING MACHINE

William I. Stuart, Chester, S.C., assignor to Springs Mills, Inc., Fort Mill, S.C.

Continuation-in-part of Ser. No. 569,397, April 18, 1975, abandoned, which is a continuation-in-part of Ser. No. 436,183, Jan. 24, 1974, abandoned, which is a continuation-in-part of Ser. No. 173,602, Aug. 20, 1971, abandoned. This application Aug. 20, 1976, Ser. No. 716,159

Int. Cl.² D01H *9/14, 13/06, 1/36*

U.S. Cl. 57—54 26 Claims



25. In a textile yarn processing machine, such as spinning and twisting machines, having a stationary frame, rotating yarn receiving spindles carried by said frame, a ring rail vertically reciprocated up and down about said spindles for guiding yarn being processed onto bobbins carried by said spindles in predetermined patterns for building packages of processed yarn, yarn guide means associated with each of said spindles for guiding yarn to said ring rail and to said spindles during yarn processing, and builder motion mechanisms including a driven crank arm pivotally mounted on said machine frame and operatively connected with said ring rail for reciprocating pivotal movement thereof for reciprocating said ring rail in the predetermined patterns; the combination therewith of control apparatus for automating movements of various elements of said yarn processing machine for preparing said yarn processing machine for doffing of full packages of processed yarn and for start-up of new packages of processed yarn, said apparatus comprising:

independent hydraulic fluid operated means connected to said builder motion mechanisms of one of said machines only for sequentially (1) lowering said ring rail to a doffing position below the bobbins on said spindles, (2) assisting said ring rail to raise under the influence of said builder motion mechanisms to a yarn processing position near the bottom of the bobbins on said spindles, and (3) lowering and jogging said ring rail up and down adjacent the bottom of the bobbins on said spindles for removing slack and for bunch building of the yarn during start-up, said hydraulic fluid operated means including a hydraulically operated piston and cylinder positively connected between said crank arm and said frame for relative reciprocating movements with respect to each other during each reciprocating movement of said crank arm and said ring rail;

a latch member pivotally mounted on said machine frame for movement to and from a latching position in engagement with said ring rail when in its doffing position and including solenoid means connected therewith for moving said latch member;

means commonly pivotally mounting each of said yarn guides on said machine frame for pivotal movement to and from a yarn processing position generally axially above said spindles to and from a doffing position generally away from the axes of said spindles for doffing of said spindles and having hydraulic fluid operated means connected therewith and with said ring rail controlling fluid operated means for being operated thereby for moving said yarn guides to and from the processing and doffing positions thereof in relation to the position of said ring rail;

timed electrical circuit control means operatively connected with said ring rail controlling fluid operated means and said latch member solenoid means for being actuated by predetermined positions of said ring rail for actuating and controlling the sequential positioning of said ring rail, said latch member and said yarn guides for doffing and start-up of said yarn processing machine; and

builder motion rewind means connected with said builder motion mechanisms and controlled by the positioning of said ring rail in the doff position for automatically rewinding said builder motion mechanisms.

4,026,097

WINDING-ON FLYER FOR A ROVING FRAME

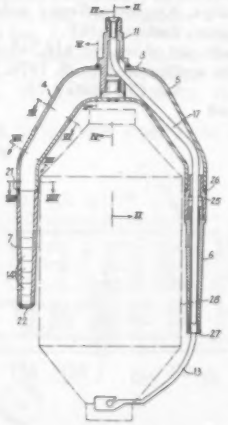
Jean Frederic Herubel, Guebwiller, France, assignor to N. Schlumberger & Cie, Guebwiller, France

Filed June 3, 1975, Ser. No. 583,446

Claims priority, application France, June 6, 1974, 74.19560

Int. Cl.² D01H *7/32*

U.S. Cl. 57—117 1 Claim



1. A winding-on flyer for a roving frame comprising a hollow shaft with an upper part and a lower part, a hollow body integral with and symmetrically arranged about the lower part

of said shaft, said hollow body being of inverted-U shaped configuration providing a pair of identical hollow limbs each having an upper end connected to said shaft and a lower end, a first arm forming an extension of one of said limbs and constituting a counterweight, said first arm comprising a first end connected to the lower end of the one of said limbs and second free end depending downwardly from the one of said limbs a second arm forming a respective extension of the second one of said limbs, said second arm comprising a first end connection to the lower end of the second one of said limbs and a second free end depending downwardly from the second one of said limbs, a presser finger carried by said second arm at the second end thereof, and a roving guide tube disposed within said second arm and extending upwardly through the interior of said second of said limbs, said body, with its said limbs, being formed as a unitary hollow piece comprising two shaped half shells of sheet metal welded together in edge-to-edge relation, and said roving guide tube extending from said second of said limbs into said upper part of said shaft whereby said roving guide tube extends as a continuous member from the top of the shaft down to the outlet from the lower end of said second hollow limb.

4,026,098

PRODUCTION OF YARN OF POLYESTER FILAMENTS HAVING A RANDOM DISTRIBUTION ALONG THE FILAMENT LENGTH OF THICK AND THIN SECTIONS DIFFERING IN DYEABILITY

David Emerson Bosley, Grifton, N.C., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 26, 1976, Ser. No. 661,634
Int. Cl.² D02G *1/02*
U.S. Cl. 57—157 TS **1 Claim**

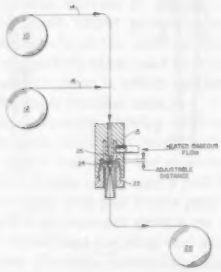
1. In the production of yarn of polyester filaments having a random distribution along the filament length of thick and thin sections differing in dyeability, by incompletely drawing as-spun yarn on a draw pin of about 1.3 to 6 cm. in diameter maintained at 60° to 90° C.; the improvement for producing a textured yarn which comprises drawing a spin-oriented polyester yarn at 82 to 95 percent of a draw ratio that would fully draw the yarn and then false-twist texturing the incompletely drawn yarn at a heater temperature greater than 200° C. for heat-setting twist in the yarn.

4,026,099

DIFFERENTIALLY DRAFTED LOFTED MULTI-COMPONENT CONTINUOUS FILAMENT YARN AND PROCESS FOR MAKING SAME

Bobby M. Phillips, Kingsport, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 616,745, Sept. 25, 1975, abandoned. This application July 29, 1976, Ser. No. 709,682
Int. Cl.² D02G *1/16*
U.S. Cl. 57—160 **6 Claims**



1. Process for producing multi-component draw-lofted yarn, the process comprising

feeding from a source of supply to and through a gaseous jet device having co-current and counter-current gaseous flows an end of undrawn or partially drawn continuous filament yarn to serve as an effect yarn component,

feeding from a source of supply to and through the gaseous jet device an end of continuous filament yarn to serve as a core yarn component and having a greater orientation than the effect yarn component,

heating the effect yarn and the core yarn components while in the jet device to a predetermined temperature above the glass transition temperature by the co-current and counter-current gaseous flows,

differentially drafting the effect yarn component in the jet device by drag forces induced by the heated co-current and counter-current gaseous flows and thereby form in the filaments at random intervals along the lengths of the individual filaments coils, loops or whorls in those portions of the efect yarn component that are drafted more than the other portions so differentially drafted and intermingling the effect yarn component with the core yarn component, the co-current and counter-current gaseous flows ranging from essentially 0–100 percent of total flow co-current and 100–0 percent of total flow counter-current with the sum total of the two flows being 100 percent, and

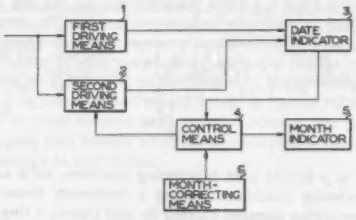
taking up the intermingled yarn components from the gaseous jet device at speeds and tensions insufficient to remove the loops.

4,026,100

TIMEPIECE WITH CALENDAR MECHANISM

Kazunari Kume; Minoru Watanabe, both of Tokorozawa; Hideshi Oono, Sayama, and Munetaka Tamaru, Tokyo, all of Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan

Filed Sept. 23, 1975, Ser. No. 616,042
Claims priority, application Japan, Sept. 25, 1974, 49-110203
Int. Cl.² G09D *3/08*; G04B *19/24*
U.S. Cl. 58—4 R **6 Claims**



1. In a timepiece including a date indicating member which is indexed one step every twenty-four hours to indicate the day of the month, wherein the date indicating member completes one cycle every 31 steps, and wherein a first driving means advances the date indicating member as a power transmission means drives the first driving means, the improvement comprising:

second driving means driven by the power transmission means;

indexing means moved by said second driving means for indexing the date indicating member independently of the first driving means to advance the date indicating means at least one step in addition to the advance caused by the first driving means;

activating means for activating the indexing means;

control means for operating the activating means when the control means is moved from a first condition, representing a month with 31 days, to a second position, representing a month with less than 31 days; and

means for indexing the control means once every thirty-one

steps of the date indicating member to move the control means from the first condition to the second condition, if the subsequent cycle of the date indicating member represents a month having less than 31 days.

4,026,101

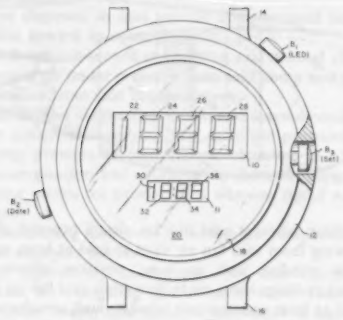
PUSH BUTTON RESPONSE OF COMBINATION LCD/LED WRISTWATCH

Norman E. Moyer, Newport Beach, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed May 27, 1975, Ser. No. 581,179

Int. Cl.² G04B *19/30*

U.S. Cl. 58—50 R **6 Claims**



1. In a digital electronic watch having two distinct digital displays for display of horological data, one display being a liquid crystal display (LCD) for low power display of hours and minutes and selected other data, and the other a light emitting diode (LED) display for use in low ambient light levels, said watch comprising a plurality of counters in cascade for counting clock pulses from a stable oscillator to keep time at least as to seconds, minutes, and hours, the combination comprising:

a number of *n* of push buttons, *n*-1 push buttons for selecting the counters from which horological data is to be displayed and for controlling on which display the data will appear, and one for use in setting of said counters in order to set the horological data in the watch;

means for decoding the state of said push buttons to obtain distinct display and setting functions;

control means for carrying out said functions as called for;

said control means continuously displays hours and minutes in said low power display while no buttons are depressed;

said decoding means detect the condition of a predetermined first one of said buttons being depressed by itself, and said control means responds to the detected condition to display hours and minutes in said light emitting diode display as well as in the LCD display;

timing means responsive to said decoding means for displaying hours and minutes in said light emitting positions for at least a predetermined period of time;

said decoding means detects the condition of a predetermined second one of said buttons being depressed by itself and said control means responds to the detected condition to display other horological data on said low power display while depressed, and means for utilizing a timing means to determine the time of this alternate horological data display and means responsive to said timing means for causing the alternate horological data display, after passage of a predetermined time interval, to also be displayed on said light emitting diode display while said predetermined second one of said buttons continues to be depressed.

4,026,102

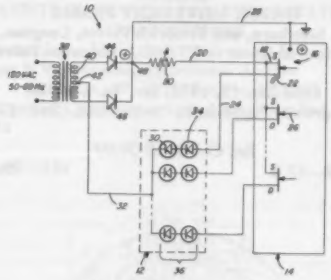
ELECTRONIC CLOCK

Leon S. Wecker, Hallandale, Fla., assignor to Topp Electronics, Inc., Miami, Fla.

Continuation-in-part of Ser. No. 436,681, Jan. 25, 1974, Pat. No. 3,888,075. This application Mar. 18, 1975, Ser. No. 559,506

Int. Cl.² G04B *19/30*; **H02J** *1/00*; **H05B** *37/00*; **G08B** *23/00*

U.S. Cl. 58—50 R **14 Claims**



1. In combination with a timer circuit having a plurality of transistors interconnected in a common electrode configuration for drive from a common supply of voltage, a display device comprising a plurality of light emitting components having common electrodes interconnected in parallel, a plurality of series circuits respectively formed by at least one of the light emitting components connected in series with the controllable path of one of the transistors, said transistors having control electrodes operated by the timer circuit, means directly interconnecting the common supply of voltage and the common electrodes of the light emitting components for conducting the same driving current through each of the series circuits, and a rectifier circuit connected to the common supply having opposite polarity terminals, said interconnecting means being connected between one of the terminals and the common electrodes of the light emitting components.

4,026,103

ELECTRONIC TIMEPIECE WITH DIGITAL DISPLAY MEANS

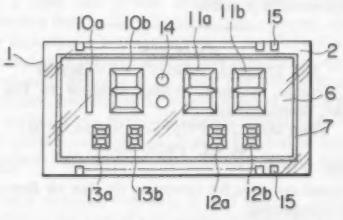
Shingo Ichikawa, Sayama; Yoshinobu Kashima, Tanashi, and Hirotoki Takamune, Tokorozawa, all of Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan

Filed Dec. 1, 1975, Ser. No. 636,606

Claims priority, application Japan, Dec. 2, 1974, 49-139280; Dec. 17, 1974, 49-144677; Oct. 16, 1975, 50-124706; Oct. 21, 1975, 50-125972; Oct. 22, 1975, 50-127142

Int. Cl.² G04B *19/30*, *19/06*; **G08B** *23/00*; **G02F** *1/13*

U.S. Cl. 58—50 R **12 Claims**



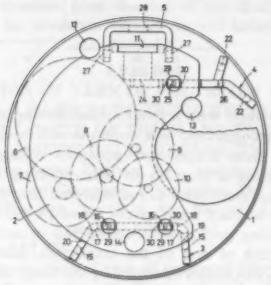
1. An electronic timepiece with digital display means, comprising a crystal quartz oscillator circuit, a frequency divider circuit receiving signal output therefrom for dividing frequency of said signal into a lower frequency one, a counter

circuit for converting the lower frequency signal into time display signal for driving said digital display means through a driver circuit, said display means comprises an elastomeric display structure comprised of a laminated structure, a part of the latter is cut away to form a light-passing window, and an illuminating light source is arranged in close proximity to said window.

4,026,104
WATCH MOVEMENT FRAME

Urs Giger, Solothurn, and Friedrich Perrot, Lengnau, both of Switzerland, assignors to ETA A.G. Ebauches-Fabrik, Switzerland

Filed Dec. 15, 1975, Ser. No. 640,786
Claims priority, application Switzerland, Dec. 27, 1974, 17339/74
Int. Cl.² G04B *29/02*
U.S. Cl. 58—52 R **16 Claims**



1. A watch movement frame comprising a plate having openings therein, at least one bridge, and at least one spacer member mounted edgewise between said plate and said bridge, said spacer member having edges and fastening studs, said edges comprising two parallel edge portions defining a straight portion of said spacer member disposed substantially perpendicular to said plate, said edge portions being respectively in contact with said plate and with said bridge, said fastening studs projecting from said edge portion in contact with said plate and being engaged in said openings therein for securing said spacer member to said plate, said bridge comprises separate centering means and securing means, and said edge portion in contact with said bridge comprises corresponding separate centering means and securing means, said centering means of said bridge and of said edge portion cooperating for positioning said bridge relative to said plate as regards respective plan configurations of said bridge and said plate regardless of the inclination of said spacer member, said securing means of said bridge and of said edge portion cooperating for securing said bridge to said spacer member, and at least one said spacer member comprises a bent portion adjacent to said straight portion.

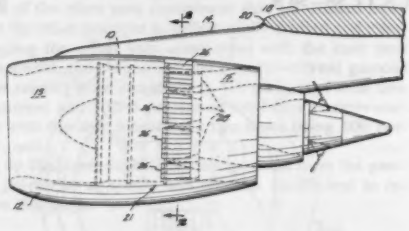
4,026,105
JET ENGINE THRUST REVERSER

Varnell L. James, Auburn, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Mar. 25, 1975, Ser. No. 561,920
Int. Cl.² F02K *3/02*
U.S. Cl. 60—226 A **32 Claims**

19. A thrust reverser for reversing the fan air flow of a fan jet engine comprising:

1. a cascade section comprising at least one cascade window, said cascade window comprising:
   a. a frame suitable for supporting a plurality of cascade elements;
   b. a plurality of cascade elements rotatably mounted in said frame, each of said cascade elements comprising a pair of elongated spaced plates lying on either side of a longitudinal axis, a plurality of vanes affixed to said elongated spaced plates and lying transverse to said longitudinal axis whereby said spaced plates and said vanes define passageways; and
   c. power means connected to said plurality of cascade elements for simultaneously rotating said plurality of cascade elements between an open position whereat said passageways allow fan air to flow through said cascade window and a closed position whereat said cascade elements prevent fan air from flowing through said cascade window; and
2. a fan duct blocking section comprising:
   a. a plurality of blocker doors movable between a closed

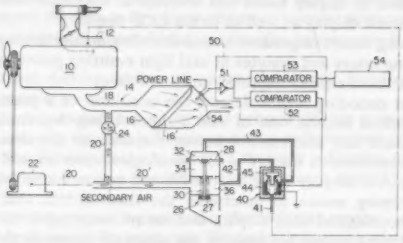


position whereat said blocker doors prevent air from flowing from said fan air duct to said at least one cascade window and an open position whereat said blocker doors allow air to flow from said fan air duct to said at least one cascade window and, simultaneously, block said fan air duct rearwardly of said at least one cascade window;
   b. a plurality of intermediate doors located between said blocker doors, said intermediate doors adapted to allow the peripheral distance of the rear edge of said blocker door section to change as said blocker door section is moved between said open and closed positions; and
   c. actuating means for moving said blocker doors between said open and closed positions.

4,026,106
OVERHEAT PROTECTION DEVICE FOR A CATALYTIC CONVERTER

Tsuyoshi Tamazawa, and Takashi Kunugi, both of Yokohama, Japan, assignors to Nissan Motor Co., Ltd., Japan

Filed May 9, 1975, Ser. No. 576,184
Claims priority, application Japan, May 11, 1974, 49-52498
Int. Cl.² F01N *3/10*
U.S. Cl. 60—277 **2 Claims**



1. In an internal combustion engine:
an intake system;
an exhaust system having a catalytic converter;

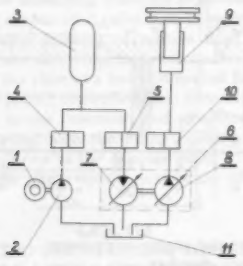
an air supply pump;
first conduit means connecting said air supply pump to said exhaust system to supply an air into said catalytic converter;
a housing divided by a movable wall defining therein first and second chambers and which moves under the control of air pressure differential between said chambers;
a partition disposed within said first chamber to divide the same into a first compartment adjacent said movable wall and into a second compartment, said partition having a passage therethrough through which said first compartment communicates only with said second compartment;
means connecting said second compartment to receive air under pressure from said air supply pump;
means defining a port through which said second compartment communicates with the atmosphere;
a valve controlled by said movable wall to open and close said port;
means disposed in said second compartment biasing said valve toward its open position;
second conduit means connecting said second chamber to receive air under pressure from said pump and a manifold pressure from said intake system;
solenoid valve means disposed in said second conduit means for selectively applying said manifold pressure and said pump pressure to said second chamber in response to deenergization and energization thereof, respectively;
warning means for producing a warning signal when energized;
thermo-sensing means for detecting the temperature within said catalytic converter;
means operatively connected with said thermo-sensing means for energizing said solenoid valve when the temperature within said catalytic converter is higher than a predetermined value and for energizing said warning means when the temperature is higher than a second predetermined value which is higher than said first mentioned predetermined value; and
said movable wall urging said valve against the bias of said biasing means toward its closed position when said manifold pressure is applied to said second chamber.

4,026,107

ELECTROHYDRAULIC PRESS DRIVE SYSTEM

Andrzej Kosek, and Adam Grudzewski, both of Krakow, Poland, assignors to Osrodek Badawczo-Rozwojowy Przemyslu Budowy Urzaszen Chemicznych "Cebea", Krakow, Poland

Filed Nov. 17, 1975, Ser. No. 633,021
Claims priority, application Poland, Nov. 23, 1974, 175892
Int. Cl.² F15B *1/02*
U.S. Cl. 60—413 **1 Claim**



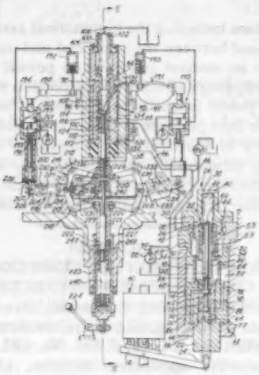
1. Electrohydraulic press apparatus comprising a hydraulic output cylinder, a hydraulic pump coupled to said cylinder to pressurize the same, a source of hydraulic fluid coupled to said pump, said cylinder, pump and source of fluid forming a first hydraulic circuit, a motor-driven pump coupled to said source, a gas-hydraulic accumulator connected to said motor-driven pump to be pressurized thereby, and a hydraulic motor connected to said hydraulic pump to drive the same, said hydraulic motor being coupled to said accumulator and to said source for discharge thereto to form a second hydraulic circuit separate from the first, said hydraulic motor being drivingly coupled to said motor-driven pump, at least one of said hydraulic pump and said hydraulic motor having variable displacement volume.

4,026,108

CONTROL DEVICES FOR HYDROSTATIC TRANSMISSIONS

Carlo Pensa, Esino Lario, Italy, assignor to Massey-Ferguson Services N.V., Curacao, Netherlands Antilles

Filed Nov. 17, 1975, Ser. No. 632,882
Claims priority, application United Kingdom, Nov. 18, 1974, 49875/74
Int. Cl.² F16H *39/46*
U.S. Cl. 60—444 **11 Claims**



1. A hydrostatic transmission having a variable capacity pump and a variable capacity motor, a first manual control including first control means, said first control means including a first portion thereof operable to cause variation in firstly the capacity of said pump and a second portion thereof operable to secondly cause variation in the capacity of said motor to thereby set a ratio between said pumps and motor with said first manual control, and a second manual control including second control means operable to vary only the capacity of said pump independently of said first control means without changing the setting of said first manual control means.

4,026,109

DUAL SIDE-BY-SIDE MASTER CYLINDER

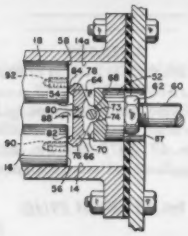
Clarence C. Fay, 17211 Edgewater Drive, Lakewood, Ohio 44107

Filed June 4, 1976, Ser. No. 692,869
Int. Cl.² F15B *7/00*
U.S. Cl. 60—581 **4 Claims**

1. In a dual side-by-side master cylinder for hydraulic brakes having dual isolated hydraulic sub-systems, said master cylinder including a housing, a pair of parallel cylinder bores in said housing, a piston reciprocably movable in each of said bores and each defining at its inner end with said cylinder a fluid chamber; and means for transmitting at least a portion of a singly applied force to the outer ends of said pistons, respectively, to pressurize hydraulic fluid contained in said respective chambers, the improvement in said means which comprises

a. a piston actuator movable in said housing along an axis parallel to the axes of said pistons and having an inner end normally spaced from the outer ends of said pistons and an outer end for receiving a single axially applied force, portions of the inner end thereof overlapping and confronting portions of the said outer ends of said pistons, respectively and

b. a rocking beam member coacting between said piston actuator and the outer ends of said pistons, respectively for dividing said single axially applied force and applying a portion of said force to each of said pistons, respectively, said rocking beam being pivotably mounted in said piston actuator for rotation about an axis perpendicular



to the plane including the longitudinal axes of both of said pistons and between the inner end and outer ends of said actuator an amount sufficient to permit engagement of the overlapping and confronting portion of said inner end of said piston actuator with either of said piston ends when the fluid pressure in the other cylinder falls because of failure in the hydraulic sub-system served thereby, whereby substantially all of the singly applied force is transmitted directly by said piston actuator to the piston serving the remaining hydraulic sub-system.

4,026,110
DEVICE FOR TEMPERATURE COMPENSATION IN A PRESSURE MEDIUM CIRCUIT

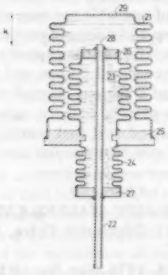
Bengt Lars Olof Engström, Trollhattan, Sweden, assignor to Saab-Scania Aktiebolag, Sodertalje, Sweden

Filed Oct. 14, 1975, Ser. No. 622,117

Claims priority, application Sweden, Oct. 14, 1974, 7412872

Int. Cl.² F15B *7/10;* **60** *542;543;572;584;585;592*

U.S. Cl. 60—592 **7 Claims**



1. A device for compensating temperature dependent volume variations in a movement transmitting pressure medium circuit, which circuit comprises at least two variable volume, movement-transmitting members and a pipe which connects the members to form a closed pressure medium system which transmits a volume change in one member to at least one other member in the pressure medium system and thereby permits movement transfer between means which are situated outside the system, characterized in that at least one of the movement transmitting members has two ends which are freely movable relative to the pipe in the lengthwise direction of the pipe, one of said ends bearing against a support plane, the position of which in the lengthwise direction of the pipe is variable as a function of a temperature-induced volume variation of a flexible means affixed to said plane, said flexible means bearing with at least one end against a means rigidly attached in relation to the pipe, while the other end of the member is freely movable relative to the flexible means, whereby temperature dependent variations in the member are compensated by displacements of the support plane under the influence of volume variations in the flexible means.

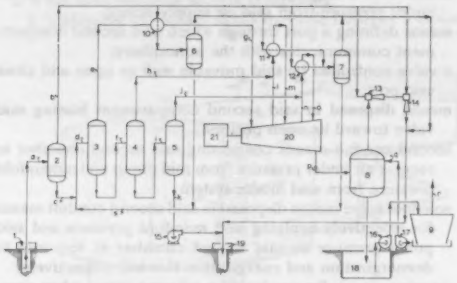
4,026,111
METHOD OF REMOVING DISSOLVED NON-CONDENSIBLES FROM GEOTHERMAL BRINES

W. Thomas Matthews, Walnut Creek, Calif., assignor to The Dow Chemical Company, Midland, Mich.

Filed Feb. 3, 1976, Ser. No. 654,826

Int. Cl.² F01K *21/00;* **F03G** *7/00*

U.S. Cl. 60—641 **4 Claims**



1. An improved method of driving a turbine with motive steam produced from a hot brine which contains non-condensible gases, said improvement comprising:

a. preflashing said brine to produce a hot vapor phase enriched in said gases and a hot liquid phase depleted therein,

b. producing said motive steam by flashing said hot liquid phase, and

c. driving said turbine solely with said motive steam.

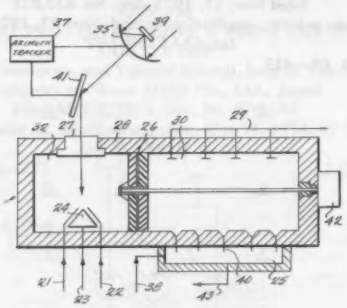
4,026,112
SOLAR REACTOR ENGINE

Robert L. Scragg, and Alfred B. Parker, both of 2937 SW. 27th Ave., Miami, Fla. 33133

Continuation-in-part of Ser. No. 588,888, June 20, 1975, which is a continuation-in-part of Ser. No. 564,087, April 1, 1975. This application Feb. 10, 1976, Ser. No. 657,383

Int. Cl.² F03G *7/02*

U.S. Cl. 60—641 **13 Claims**



1. A solar reactor engine comprising:

a solar reactor chamber,

means for controllably coupling chlorine and hydrogen to said solar reactor chamber,

means for controllably coupling oxygen to said solar reactor,

means for directing electromagnetic radiation into said chamber to thereby exothermicly react said hydrogen and chlorine in the presence of said oxygen to generate hydrogen chloride at a high pressure and temperature level,

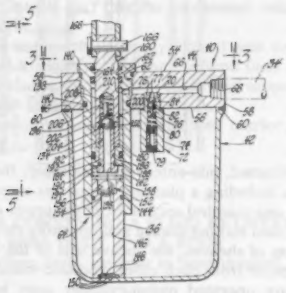
a turbine forming at least a portion of at least one wall of said reaction chamber,
said pressurized hydrogen chloride driving said turbine,
said turbine driving a power utilization device,
an exhaust chamber positioned on the side of said turbine opposite from said reactor chamber,
means for converting said hydrogen chloride to hydrochloric acid to thereby form a partial vacuum in said exhaust chamber,
said partial vacuum increasing the pressure differential across said turbine to thereby increase the efficiency thereof, and
means for conveying said hydrochloric acid away from said exhaust chamber.

4,026,113

TILTING CAB CONTROL APPARATUS

Clarence A. Sherman, 31303 Churchill, Birmingham, Mich. 48009

Filed June 1, 1976, Ser. No. 691,277
Int. Cl.² F16D *31/02*
U.S. Cl. 60—477 **18 Claims**



1. Tilting cab control apparatus comprising: a horizontally extended cover plate including upper and lower surfaces and edge surfaces extending between the upper and lower surfaces to define the periphery of the plate; the lower surface including a mounting portion for sealing engagement with a pump reservoir opening such that the upper and edge surfaces are exposed; a pump opening extending between the upper and lower surfaces; a relief valve opening in the plate communicating with the pump opening and opening downwardly through the lower surface of the plate to permit excessively pressurized fluid from the pump opening to flow back to the reservoir; a control valve bore located between the upper and lower surfaces of the plate extending inwardly from one of the edge surfaces thereof; said control valve bore being in communication with the pump opening to receive fluid therefrom; a control orifice communicating the control valve bore with the lower surface of the plate at a location spaced from said relief valve opening to permit controlled fluid flow from the control valve bore back to the reservoir; and an output port in the plate communicating with the pump opening and opening outwardly through one of the exposed plate surfaces to conduct fluid from the pump opening externally of the plate.

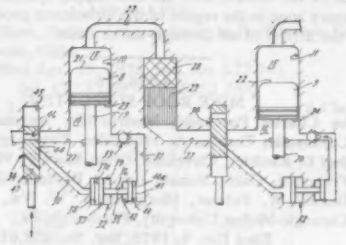
4,026,114

REDUCING THE STARTING TORQUE OF DOUBLE-ACTING STIRLING ENGINES

Richard C. Belaire, Livonia, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed July 9, 1976, Ser. No. 703,882
Int. Cl.² F02G *1/06*
U.S. Cl. 60—525 **4 Claims**

1. A closed working fluid circuit for a regenerative type Stirling engine, the closed working fluid system having a plurality of chambers subdivided by double-acting pistons operating therein, the subdivided chambers being connected in a series whereby the hot chamber is in communication with the cold chamber of the next most adjacent cylinder, said intercommunication between adjacent cylinders containing a regenerator and a cooling mechanism, the improvement comprising:
a. means defining a fluid path in parallel with said intercommunication,



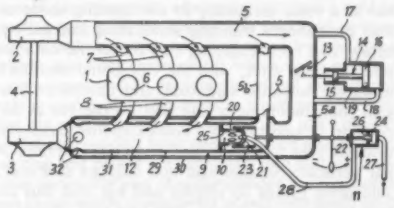
b. fluid pressure amplifying means interposed in said path in parallel whereby the mean pressure in said intercommunication may be increased in magnitude when transmitted to the low temperature variable volume chamber, and
c. control means for selectively placing said path in parallel fluid communication with said intercommunication and for selectively isolating said path in parallel therefrom.

4,026,115

SUPERCHARGED INTERNAL COMBUSTION ENGINES, IN PARTICULAR DIESEL ENGINES

Jean F. Melchior, and Thierry Andre, both of Paris, France, assignors to The French State, Paris, France

Filed Mar. 28, 1975, Ser. No. 562,961
Claims priority, application France, Mar. 29, 1974, 74.11011
Int. Cl.² F02G *3/00*
U.S. Cl. 60—614 **28 Claims**



1. A power plant comprising an internal combustion engine; turbocompressor set for supercharging the engine and comprising a compressor, a turbine driving the same and a passage communicating with the compressor outlet and the turbine inlet and serving to return to the turbine all that part of the compressor delivery which does not pass through the engine, the engine comprising a variable-volume working chamber so communicating via an inlet duct with the compressor outlet and via an exhaust duct with the turbine input as to be in parallel with at least some of the passage; an auxiliary combustion chamber divided into an upstream primary combustion zone, to which fresh air is supplied through the passage and fuel is supplied by a fuel supply system, and a downstream secondary dilution zone, to which fresh air is supplied through the passage and combustion gases through the exhaust duct, the secondary zone delivering hot gases to the turbine to help drive the same; and restricting means in the passage adapted to produce, between the air leaving the compressor and the gases entering the turbine, a pressure drop which is substantially independent of the ratio of the rate of air flow through the passage to the total air delivery from the compressor but

which varies in the same direction as the pressure in such passage upstream of the restricting means; in which power plant the passage is divided into two parallel arms, a first such arm having the restricting means and terminating downstream of the primary combustion zone, the second arm of the passage being connected to the primary zone via at leat one orifice of a cross section such that the pressure drop is produced substantially between the upstream and downstream ends of the orifice, and the fuel supply system entering the primary zone in the region of the turbulence produced therein by the arrival of air through the orifices.

4,026,116

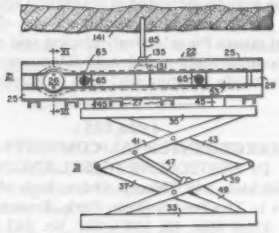
MINE ROOF SUPPORTING

John Charles Purcupile, Monroeville; Angela L. Lenden, Coraopolis; Thomas A. Mutschler, Pittsburgh, all of Pa.; Joel D. Kneisley, Cleveland, Ohio; Mark P. Wieszczyk, San Francisco, Calif.; Ronald Lasser, Williamsville, N.Y., and Donald W. Fulmer, Morgantown, W. Va., assignors to Carnegie-Mellon University, Pittsburgh, Pa.

Filed Dec. 9, 1975, Ser. No. 639,010

Int. Cl.² E21C *11/02;* **E21D** *20/00*

U.S. Cl. 61—45 B **9 Claims**



4. The method of providing roof support for a coal mine or the like with bolts, the said method being practiced with apparatus including an elongated bar of resilient material and drive means connected to said bar for vibrating said bar at a sonic frequency in the bending mode of said bar, thus producing a standing wave along said bar by supports, below said roof, engaging said bar at the node positions of said standing wave, with the vibrational movement said bar upwardly towards said roof and downwardly away from said roof, mounting a said bolt on the bar at an anti-node position of said bar, said bolt extending vertically upwardly towards said roof from said anti-node position, setting said bar vertically so that said bolt engages said roof, actuating said drive means to vibrate said bar and thus causing said bolt to penetrate directly into said roof, during the upward movement of said bar and exerting a vertical force upwardly on said bar to maintain said bolt continuously in pressure engagement with said roof under the action of said force until said bolt is driven into said roof.

4,026,117

EXPANSIBLE MANDREL

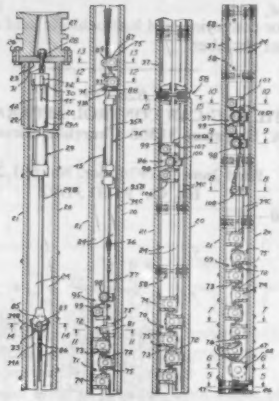
Charles L. Guild, 7 Stone Tower Lane, Barrington, R.I. 02806, and Willard B. Goodman, P.O. Box 62, Newport, Oreg. 97365

Filed June 11, 1976, Ser. No. 695,259

Int. Cl.² E02D *7/30*

U.S. Cl. 61—53.72 **14 Claims**

1. An expansible tubular mandrel for use in driving or withdrawing tubular members such as piles, said mandrel comprising sections each having a lengthwise channel, a head connected to and joining the upper ends of said sections, said sections below said head movable from a retracted pile-entering relationship into an expanded pile-gripping relationship, said mandrel including a turning sheave at the bottom thereof, first and second means within said mandrel, each of said means including an anchor connected to a section, sets of sheaves spaced lengthwise of the mandrel with some sheaves carried by one section and the others carried by the other section, each sheave protruding from the section by which it is carried, and a cable in such trained engagement with said sheaves and connected to the appropriate anchor that a pull on the cable tends to straighten it with force applied through the sheaves to establish a predetermined relationship between the sections, in the case of the first means, the expanded pile-gripping relationship and in the case of the second means



the retracted, pile-entering relationship, the cable of the first means including a plurality of courses extending downwardly along one mandrel section from the upper end of the mandrel about said turning sheave and upwardly through the appropriate sets of sheaves, the sheave sets of the two means spaced lengthwise from each other, and said mandrel including fluid pressure operated piston-cylinder units adjacent the upper end thereof, one for each of said first and second means with the stem of its piston connected to the cable thereof and operable to exert a straightening pull thereon.

4,026,118

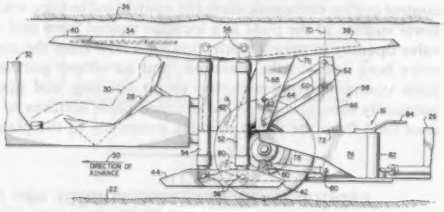
MOVABLE ROOF SUPPORT MECHANISM

Frank Vernon McCay, Jr., deceased, late of Salt Lake City, Utah (by The Continental Bank & Trust Co., administrator), assignor to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed July 14, 1976, Ser. No. 705,370

Int. Cl.² E21D *15/44*

U.S. Cl. 61—63 **9 Claims**



1. A machine to provide progressive and temporary roof support along a straight path in a tunnel, said machine having a longitudinal axis oriented in the direction of forward motion said machine comprising:

a vehicle, having means thereon for translational motion longitudinally;

a first pair of roof supports at opposite sides of said vehicle, said first roof supports individually and movably attached

to said vehicle by a movable connecting mechanism located intermediated said first roof supports and said vehicle, said connecting mechanism substantially preventing longitudinal, lateral and angular motion of said first roof supports relative to said vehicle;

a pair of carrier arms, at opposite sides of said vehicle, and means for mounting said arms translatably to said vehicle, said mounting means maintaining translation substantially parallel to the longitudinal axis of said vehicle;

a second pair of roof supports at opposite sides of said vehicle, each of said second roof supports individually and movably attached to one of said carrier arms by a movable connecting mechanism intermediate said second roof support and said carrier arm, said connecting mechanism substantially preventing longitudinal, lateral and angular motion of said second roof supports relative to said carrier arm;

a first pair of feet individually and movabiy attached to said vehicle at opposite sides of said vehicle and constrained from longitudinal, lateral and angular movement relative to said vehicle;

a second pair of feet, each foot individually and movably attached to one of said carrier arm and constrained rom longitudinal, lateral and angular movement relative to said carrier arm;

reversible drive means to vertically extend said roof supports and feet to press against the roof and floor respectively of said tunnel, and to retract said roof supports and feet away from said roof and floor;

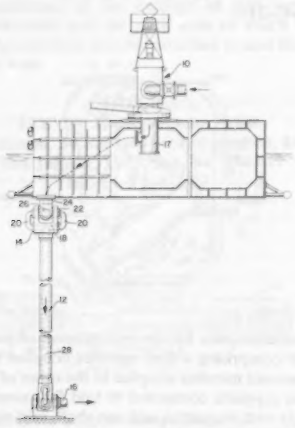
reversible actuation means to translate said carrier arms.

4,026,119

DEVICE FOR CONVEYING A FLUID BETWEEN A SUBSEA DUCT AND A BUOY

Giuseppe Dotti, Milan, Italy, assignor to Snamprogetti, S.p.A., Milan, Italy

Filed Dec. 3, 1975, Ser. No. 637,126
Claims priority, application Italy, Dec. 3, 1974, 30123/74
Int. Cl.² E02B *17/00*; B63B *21/00*; B65B *1/04*
U.S. Cl. 61—95 **10 Claims**



1. A device for conveying fluid between a subsea duct and a buoy, comprising:

a buoy having a conduit for conveying fluid,

articulated hollow legs for anchoring said buoy,

joints adjacent said buoy which connect said buoy to said legs and which have bores therethrough that connect the conduit of said buoy to the interior of said hollow articulated legs,

a subsea duct which opens into said hollow articulated legs below said joints, and

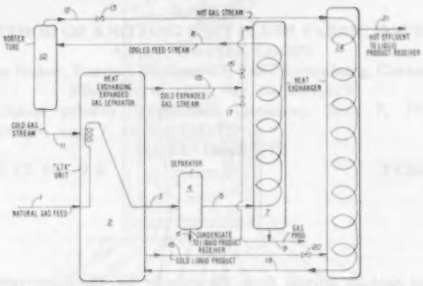
a passageway formed by each of said interconnected hollow legs and bores of each of said joints for conveying fluid between said buoy and said subsea duct.

4,026,120

NATURAL GAS THERMAL EXTRACTION PROCESS AND APPARATUS

James L. Tallant, Dallas, Tex., assignor to Halliburton Company, Duncan, Okla.

Filed Apr. 19, 1976, Ser. No. 677,941
Int. Cl.² F25B *9/02*; F25J *3/06*
U.S. Cl. 62—5 **6 Claims**



1. A method of treating natural gas in a closed energy cycle process to recover condensable components in said stream comprising cooling a high pressure gas stream to a temperature in the range of about 25°–60° F by passing said high pressure gas stream through a cold environment provided by an expanded gas in an expanded gas separator; separating condensed components from said high pressure gas stream; introducing said cooled high pressure gas stream into a vortex chamber tangentially, expanding said gas at high velocity, and separating said gas stream into a hot gas stream and a cold gas stream; passing said cold gas stream into said cold environment as part of said expanded gas in said expanded gas separator to provide said cold environment which cools said high pressure gas stream and to recover therefrom condensable components in said cold environment as liquid product; passing said hot gas stream through a cooler where it is indirectly cooled by said cold product from said expanded gas separator and introducing said cooled hot gas stream into said expanded gas separator as another part of said expanded gas to separate and recover condensable components as said cold liquid product; adjusting the temperature and pressure of the expanded gas and passing said expanded gas to a gas product receiver from said expanded gas separator; and adjusting the temperature and pressure of the cold liquid product and passing said liquid product to a liquid product receiver from said expanded gas separator.

4,026,121

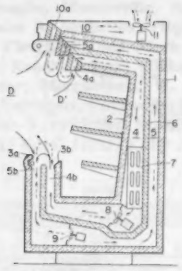
DEFROSTING IN OPEN SHOW CASE OF COLD-AIR-CIRCULATION TYPE

Yoshitaka Aokage, and Yoshio Yamana, both of Kawasaki, Japan, assignors to Fuji Denki Seizo Kabushiki Kaisha, Japan

Filed May 17, 1976, Ser. No. 686,895
Claims priority, application Japan, May 20, 1975, 50-59908
Int. Cl.² F25D *21/06*; A47F *3/04*
U.S. Cl. 62—151 **6 Claims**

4. In an open show case of cold-air-circulation type having: a case structure including an outer cabinet and a cooled commodity box disposed in the innermost part of said cabinet and adapted to hold commodities in cooled state, said case struc-

ture having a front opening for access from the outside to said commodities; a cold-air-circulation passage means formed adjacently around said box and provided therewithin with air cooling means and first air circulation means for circulating cold air through said passage means, said passage means having at respectively opposite ends thereof, and at opposite sides of said access opening, ejection nozzle means and corresponding suction inlet means between which a cold-air curtain is formed when air is thus circulated in normal cooling operation; and air passage means provided with second air circulation means and having air ejection nozzle means and corresponding suction inlet means for forming at least one protective air curtain outside of said cold-air curtain for shielding



said cold-air curtain from the outside air, the improvement wherein the air circulation means in at least one of said passage means is reversible in air circulating direction, and wherein there is provided means operable at the time of defrosting of the show case to stop the operation of said air cooling means and operating said first and second air circulation means respectively in mutually adjacent air passage means to circulate air in mutually opposite directions thereby to cause air to flow in short-circuited flow at said ejection nozzle means and suction inlet means, in which flow, air ejected from one passage means is immediately sucked into an adjacent passage means without forming an air curtain across the access opening, thereby to draw warm outside air into said passage means and thereby to accomplish defrosting.

4,026,122

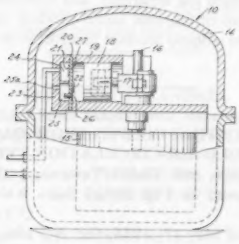
REFRIGERATION SYSTEM

Edgar D. Kuhn, Addison; Leonard E. Lathrop, Adrian, and Robert J. Sanderson, Manitou Beach, all of Mich., assignors to Primore Sales, Inc., Adrian, Mich.

Filed Oct. 11, 1974, Ser. No. 513,999

Int. Cl.² F04B *49/02*

U.S. Cl. 62—196 C **8 Claims**



1. In a refrigeration system comprising a compressor having a compression chamber which is cyclically varied in size to compress refrigerant and a valve plate having an inlet valve controlling the flow of refrigerant from a suction chamber to said compression chamber and an outlet valve controlling the flow of refrigerant out of said compression chamber, expansion means, an evaporator and a condenser, the improvement comprising

said valve plate having a first surface adjacent said compression chamber and an opposite second surface exposed to the suction chamber,

said inlet valve being associated with said first surface,

said outlet valve being associated with said second surface,

said valve plate having an opening extending therethrough between said first and second surfaces,

a normally open spring-loaded valve,

a body having an opening therethrough,

a valve movable axially in said opening in said valve body,

a valve seat in said body against which said valve may seat,

a stop in said body,

and spring means normally urging said valve away from said valve seat against said stop,

said valve being positioned between said compression chamber and said suction chamber, so that when the compressor is not operating, a direct passage is provided between the compression chamber and the suction chamber,

the end of said valve body nearest said stop being substantially flush with said first surface,

said valve substantially filling the space between said valve seat and said stop and said valve seat being positioned relative to said body which is exposed to said compression chamber and the length of the end of the opening in the valve body nearest the compression chamber being such that there is minimal volumetric area between said valve seat and said compression chamber when said valve is against said valve seat due to pressure in said compression chamber thereby maintaining a minimum recompression volume.

4,026,123

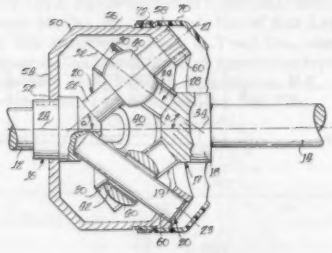
UNIVERSAL JOINT

Metin Mustafa Durum, Elmhurst, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Dec. 5, 1975, Ser. No. 637,902

Int. Cl.² F16D *3/30*

U.S. Cl. 64—21 **5 Claims**



1. A universal joint for the transmission of torque between two shafts comprising a first member coupled to one of said shafts, a second member coupled to the other of said shafts, at least three supports connected to said first member at a first acute angle with respect to said one shaft, said supports having an end remote from said first member, a coupling member rotationally and slidably mounted on each of said supports, said second member having at least three grooves therein extending at a second acute angle with respect to said outer shaft, said coupling members being received within said grooves whereby torque can be transmitted between said shafts when said shafts intersect at an angle, and a torque transmitting member extending between said one shaft and said remote end of said supports for transmitting torque to said remote end.

4,026,124

CASE FOR AXLE HAVING UNIVERSAL JOINT

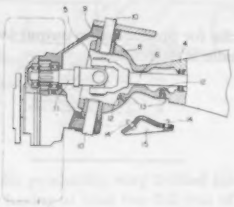
Kazuo Toyokuni; Shunzo Yamada; Teizo Takahashi; Hajime Nakamura, all of Sakai; Kazunari Nobutomo, and Shinji Kawakami, both of Souja, all of Japan, assignors to Kuboto Tekko Kabushiki Kaisha, Osaka, Japan

Filed Apr. 8, 1975, Ser. No. 566,120

Claims priority, application Japan, July 22, 1974, 49-87595[U]; Sept. 25, 1974, 49-116297[U]

Int. Cl. F16d 3/84

U.S. Cl. 64—32 R 3 Claims



1. A case for an axle having a universal joint for transmitting power to steering and propelling wheels comprising:

a tube of cast metal encompassing the entire periphery of said axle in the circumferential direction,

a substantially semispherical first member having an exterior wall, a cup-shaped portion and a diameter larger than said tube formed as an integral part of said tube, said tube and said semispherical first member being conjoined by a constricted neck portion,

a substantially semispherical second member of cast metal having a cup-shaped portion connected to the first member and rotatable relative thereto in the direction of flexion of the universal joint, the confronting spacedly arranged cup-shaped portions of said first and second members surrounding the universal joint, and

a removable reinforcing member substantially approximating a shoehorn the enlarged area of which is complementally conformed to the exterior of said semispherical second member and the neck zone of which is complemental to said tube suitably attached to said first member and said tube.

4,026,125

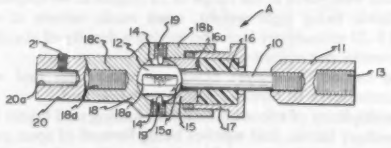
FLEXIBLE DRIVE ADAPTER

James T. Patterson, 54 S. Main St., Farmington, Utah 84025

Filed July 10, 1975, Ser. No. 594,717

Int. Cl. F16d 3/02

U.S. Cl. 64—7 5 Claims



1. A flexible drive adapter comprising:

a. first and second rotary members having their axes of rotation normally in alignment;

b. a universal joint coupling said rotary members;

c. said first rotary member having a cylindrical surface concentric with its axis of rotation and spaced from said universal joint;

d. said second rotary member having an extension reaching beyond said universal joint in the direction of said first rotary member and providing a cylindrical cavity that is concentric with the axis of rotation of said second rotary member, that is of larger diameter than the cylindrical surface of said first rotary member, and that contains said cylindrical surface; and

e. a bushing of rubber or like material filling the space between the cylindrical wall of said cavity and said cylindrical surface for offering resilient resistance to any angular displacement of the axis of rotation of either rotary member relative to the axis of rotation of the other member.

4,026,126

METHOD OF KNITTING KNIT PLUSH FABRIC HAVING A NAP, OR PILE LOOPS

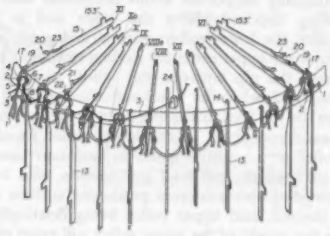
Otto Nuber, Fouquet Siedlung 53, 7407 Rottenburg, Germany

Filed Dec. 4, 1975, Ser. No. 637,819

Claims priority, application Germany, Dec. 7, 1974, 2458009; Aug. 7, 1975, 2535197

Int. Cl.² D04B 9/12

U.S. Cl. 66—9 R 3 Claims



1. Method to knit plush fabric on a knitting machine having a row of needles, in which the fabric has base knitted fabric in which base yarn (1) is knitted to form knit stitches or loops (2) and an inlay or plaiting plush yarn (3) having loop and side portions, interknitted with and anchored to the base fabric comprising the steps of

knitting a course of stitches (2) of the base fabric on the needles (15) of the row with at least one base yarn thread (1);

pushing the loops (2) of the knitted stitches up on the shanks of the needles (15);

positively positioning the loops (2) of the stitches of the base yarn thread (1) at a predetermined position on the shanks of the needles;

pulling the inlay or plaiting yarn over the needle shanks to form plush inlay loops (4) having side portions (8);

engaging, and pulling the inlay or plaiting yarn (3) in a direction essentially perpendicular to the direction of movement of the needle, and holding the inlay or plaiting yarn in engaged, pulled position;

pulling the plush inlay or plaiting loops (4) through the loops (2) of the stitches of the knitted base yarn (1) while continuing to hold and engage the inlay or plaiting yarn;

sliding the loops (2) of the stitches of the base yarn (1) over the shank of the needle (15) towards the hook thereof while continuing to hold and engage the inlay or plaiting yarns (13) in said pulled position;

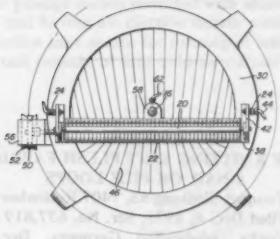
knocking off the loops (4) of the inlay or plaiting yarn (3) over the end of the needles while continuing to hold and engage the inlay or plaiting yarn in said pulled position;

and pulling tight the thus formed loops of the held and engaged inlay or plaiting yarn, to lock and thereby wrap the loop (4) of the inlay or plaiting yarn (3) around the side portions (5, 6) of the knit loops, or stitches of the base yarn (1).

4,026,127
ROLL FEED FOR CIRCULAR KNITTING MACHINE

Marcus C. McCreary; William M. McCreary, and Mary G. McCreary, all of Drawer A, Lexington, Ala. 35648

Filed Jan. 2, 1976, Ser. No. 646,000
Int. Cl.² D04B 15/48
U.S. Cl. 66—132 R 9 Claims



1. A roll feed for a circular knitting machine of the type having a needle cylinder receiving a plurality of yarn strands for supply cones, said roll feed comprising a pair of parallel rollers rotatably supported about horizontal axes with one roller being disposed above the other and in peripheral contact with the lower roller, yarn strand guide means disposed above the upper roller for guiding strands of yarn downwardly into the nip between the roller, yarn strand guide means disposed below the lower roller and guiding strands of yarn from the roll feed to knitting needles on the machine, and drive means connected to the lower roller for driving the lower roller at a positive speed to maintain constant yarn tension between the roll feed and needles, said lower roller being provided with a friction producing surface on the periphery thereof, said upper roller being floatingly mounted whereby the weight of the upper roller will exert nip pressure against the lower roller for maintaining frictional warp around contact between the yarn strands and the lower roller, said friction surface on the lower roller being rubber external surface to increase frictional contact between the lower roller and the yarn strands, said upper roller being a steel roller having a diameter substantially less than the diameter of the rubber covered lower roller, said drive means for the lower roller including means for varying the speed of the lower roller to vary the tension of the yarn strands, said upper yarn strand guide means including a plurality of equally spaced eyelets disposed above the upper roller and spaced laterally thereof for guiding the individual yarn strands downwardly into the laterally facing nip between the upper and lower rollers, and means vertically adjustably supporting said eyelets for varying the position thereof.

4,026,128
FAULTY NEEDLE SENSING

Ernesto E. Blanco, Belmont, Mass., assignor to Universal Textile Machine Corporation, Lawrence, Mass.

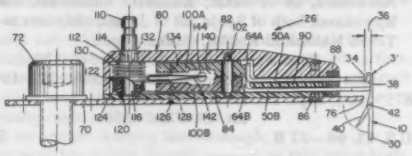
Filed Dec. 12, 1975, Ser. No. 640,063
Int. Cl.² D04B 35/10, 35/18
U.S. Cl. 66—165 23 Claims

1. Apparatus for sensing needles of the type employed in a knitting machine comprising:

first and second needle sensors, each said needle sensor having a surface portion for engagement with a portion of a needle,

structure supporting said first and second needle sensors in predetermined relation for concurrently sensing different portions of the same needle and producing an output indication thereof,

and an indicator coupled to said first and second needle sensors, said indicator being responsive to movement of one sensor relative to the other sensor indicative of a

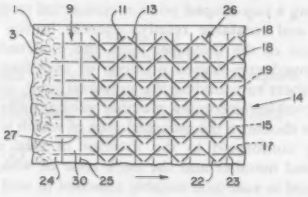


faulty needle for producing an output indicating that the sensed needle is defective.

4,026,129
DIMENSIONALLY STABLE FABRIC

Herschel Sternlieb, 18 Strawberry Hill Road, Andover, Mass. 01810

Continuation-in-part of Ser. No. 452,814, March 20, 1974, abandoned. This application July 7, 1975, Ser. No. 593,702
Int. Cl.² C04B 23/08, 23/10; D04B 7/12
U.S. Cl. 66—192 6 Claims



1. A dimensionally stable, composite fabric comprising:

a carded layer of intermingled, unbonded fibers, of about one to two inches in length, said layer being normally uncompacted, and about one eighth inches to one half inch in thickness and having a density of about 3 ounces per square yard;

a layer of woven scrim fabric formed of spun polyester warp and weft yarns in the range of 28 singles to 40 singles, said fabric being light weight, open mesh, woven at about 15–25 strands per inch and having a density of about 1.75 ounces per square yard;

said carded fiber layer being superposed on said woven scrim layer to form a composite fabric and

a multiplicity of tricot knit stitches joining said layers into a unitary fabric, said stitches being formed of spun polyester yarns in the range of 16 singles to 24 singles, and being about 12 gauge 12 stitches per inch with a density of about 2 ounces per square yard,

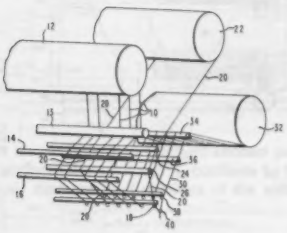
said stitches being at predetermined tension with the chain stitch wales thereof embedded below the plane of the exposed face of said cardable fiber layer and compacting said layer down toward the plane of said woven fabric while forming a plurality of soft, elongated fibrous ribs on each side of, and in parallelism with, said wales;

and zig-zag laps of said tricot stitches overlying the exposed woven polyester yarn face on the opposite side of said fabric to increase the abrasion resistance thereof.

4,026,130
METHOD OF WARP KNITTING

Bharat Jaybhadra Gajjar, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 8, 1975, Ser. No. 620,833
Int. Cl.² D04B 23/00, 27/00
U.S. Cl. 66—203 10 Claims

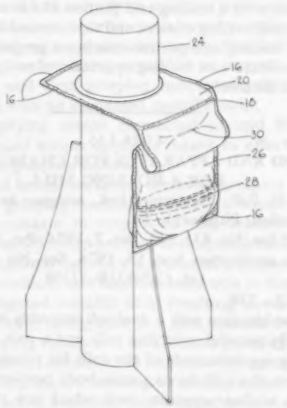


1. In a method for producing warp knitted fabrics on a warp knitting machine having at least two full sets of warp threads, including the steps of feeding one of said two full sets of threads to one of two operating guide bars of said warp knitting machine and feeding the other of said two full sets to the other operating guide bar of said warp knitting machine to form a knitted fabric, there being only one thread in each guide of each operating guide bar, the improvement comprising: supplying one of said full sets of threads from two partial beam sets of threads, said two partial beam sets of threads being fed at different rates to said operating guide bar in a pattern, said pattern being predetermined groups of adjacent threads from one partial beam set of threads, each group being separated by at least one thread from the other partial beam set of threads.

4,026,131
LAUNDRY ADDITIVE DISPENSER

Elizabeth L. Dugger, Park Ridge, and Alan B. Kessler, Ramsey, both of N.J., assignors to Lever Brothers Company, New York, N.Y.

Filed Aug. 27, 1975, Ser. No. 608,299
Int. Cl.² D06F 39/02
U.S. Cl. 68—17 A 6 Claims



1. A laundry additive dispensing article for the dispensing of a laundry additive after the spin or during the rinse period of an automatic clothes washing machine having an upright central agitating post comprising:

a. two rectangular plastic sheets joined together and sealed at their perimeter, and at the midsection thereof to form a top and bottom section;

b. said top section having an aperture therethrough to allow said article to be placed about the central agitating post;

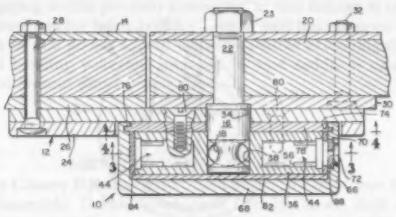
c. said bottom section being completely sealed and having the laundry disposed therein;

d. opening means for allowing egress of the laundry additive from said container occasioned by the centrifugal force exerted on the article from the continuous rotational movement of said central agitating post about its axis, said opening means comprising the joinder of said plastic sheets when folded over an area at a point other than the perimeter thereof and at a point above the level of the laundry additive when said article is held in an upright position, such that at least one of the sheets will rupture when subjected to said centrifugal force.

4,026,132
HIGH SECURITY LOCK

Walter E. Best, c/o Best Lock Corporation, P.O. Box 103, Indianapolis, Ind. 46206

Filed Aug. 13, 1975, Ser. No. 604,180
Int. Cl.² E05B 65/48, 67/36
U.S. Cl. 70—9 20 Claims



1. A pick-resistant lock, comprising a lock body,

a plurality of key-actuated locking mechanisms mounted in said lock body, each including a rotatable key plug having a key-slot,

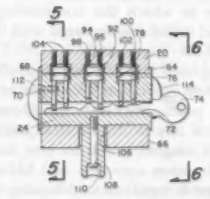
means interconnecting the key plugs of said mechanisms for joint rotation and preventing their independent rotation,

and a guard mounted on said lock body for movement between one position in which it exposes the key slot of one locking mechanism for key insertion therein while covering the key slot of another locking mechanism, and a second position in which it exposes the key slot of said other locking mechanism for key insertion therein while covering the key slot of said one locking mechanism.

4,026,133
FLOATING BAR BALL BEARING LOCK DEVICE

V. C. Marter, 1440 Texas St., Baker, La. 70714

Filed Mar. 19, 1976, Ser. No. 668,705
Int. Cl.² E05B 65/06
U.S. Cl. 70—134 8 Claims



1. A dead bolt type lock device comprising housing means, sleeve means substantially concentrically arranged within said

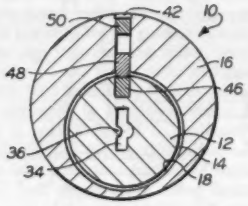
housing means and having the opposite ends thereof open, reciprocal bolt means disposed within said sleeve means, yieldable means connected between the housing means and bolt means for constantly urging said bolt in one direction, bolt engaging means disposed within said housing means and operable for engaging said bolt and selectively moving said bolt against the force of said first mentioned means, key slot means for receiving a key therein, and floating bar and ball bearing means in communication with said key slot means and cooperating with said bolt engaging means for actuation thereof to provide alternate extended and contracted positions for the bolt with respect to the housing means to provide locked and unlocked positions for the locking device.

4,026,134

MAGNETIC LOCK

Joseph W. Woolfson, 10 Montague Terrace, Brooklyn, N.Y. 11201

Filed Dec. 5, 1975, Ser. No. 638,036
Int. Cl.² E05B 27/04, 47/00
U.S. Cl. 70—276 **29 Claims**



1. In a magnetic lock including a stationary part and a movable part in surface-to-surface relation with said stationary part for movement between locked and unlocked positions, said stationary and movable parts each having a passage therein which extend away from said confronting surfaces and which are positioned for alignment and communication when said movable part is in its locked position, the improvement which comprises:

a magnetic pin tumbler slidably disposed in one of said passages and being of lesser length than said one passage;

a driver slidably disposed in the other of said passages and being of lesser length than said other passage but of greater length than the difference between the lengths of said first passage and said magnetic pin tumbler, said driver being in end-to-end relation with said magnetic pin tumbler, said driver and said pin tumbler being slidably disposed in said aligned passages for movement between a first extreme position wherein said pin tumbler straddles both said passages to prevent relative movement between said parts, a second extreme position wherein said driver straddles said two aligned passages to prevent relative movement between said parts and an intermediate unlocked position in which the confronting ends of said tumbler and said driver are coplanar with the confronting surfaces of said two parts; and

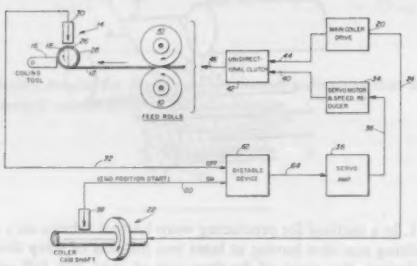
means for biasing said driver and magnetic pin tumbler toward the end of one of said passages remote from the other of said passages with a predetermined force, whereby when a key is disposed adjacent one of said passages with a magnet poled to bias said pin tumbler magnet in a direction opposite said biasing means and with a force that is equal to said biasing force, then the confronting ends of said pin tumbler magnet and said driver are in said intermediate position to thereby unlock said lock.

4,026,135

SPRING COILING MACHINE WITH AUXILIARY DRIVE AND CONTROL

George Joseph Yagusic, Litchfield, and Bernard Pierre Lampietti, Goshen, both of Conn., assignors to Torin Corporation, Torrington, Conn.

Filed May 14, 1975, Ser. No. 577,617
Int. Cl.² B21F 3/04
U.S. Cl. 72—14 **15 Claims**



1. In a spring coiling machine, the combination of at least one pair of feed rolls for longitudinally advancing wire to a coiling station, at least one coiling tool at said station arranged to engage said longitudinally advanced wire and to obstruct feed movement thereof whereby progressively to bend the same to a coil spring configuration, a main drive means for said feed rolls operable to rotate said rolls whereby to advance a length of wire an increment less than that required for a coil spring of predetermined configuration and dimensions, fast response auxiliary drive means comprising an electrically operable servo motor and speed reducing means for said feed rolls operable to advance a final increment of wire for said predetermined coil spring, clutch means between said feed rolls and said main and auxiliary drive means operable to render effective the higher of two input rotational velocities from said main and auxiliary drive means, the latter drive means thus rotating the feed rolls for feeding said final increment of wire when the rotational velocity of said main drive means drops below that of the auxiliary drive means, and an auxiliary drive control including means operable during the rotation of said feed rolls by said main drive means to actuate said servo motor, said control also including means responsive to the position of a leading end portion of the wire in a spring formed at said coiling station, and said control being operable when said leading end portion reaches a predetermined position to terminate wire feeding operation of said auxiliary drive means and feed rolls.

4,026,136

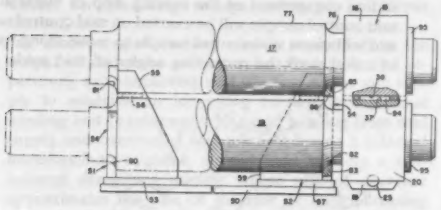
METHOD AND APPARATUS FOR CHANGING ROLLS FOR A ROLLING MILL

Raymond H. Pell, Chesterton, Ind., assignor to National Steel Corporation, Pittsburgh, Pa.

Division of Ser. No. 431,320, Jan. 7, 1974, Pat. No. 3,951,268.
This application Apr. 13, 1976, Ser. No. 676,577
Int. Cl.² B21B 31/08
U.S. Cl. 72—238 **7 Claims**

6. In combination with a dual roll assembly including a pair of generally parallel overlying rolls and a pair of chock units supporting opposite ends of the rolls for rotation about horizontal axes, the rolls having main body portions and reduced diameters at their opposite ends which are received in the chock units forming recesses between the main body portions and the chock units, the chock units being axially removably from and insertable on the rolls for permitting repair or replacement of the rolls in the chock units; supporting means received under each of said rolls and in said recesses to hold the rolls independently of the chock units in generally hori-

zontal plane and to prevent axial movement of the rolls during removal or insertion of the chock units relative to the rolls,



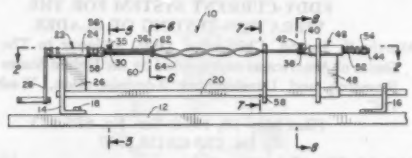
said support means including first and second pair of arcuate supporting surfaces dimensioned to conform to the curvature of the reduced diameter end portions of the rolls.

4,026,137

TWISTING AND BENDING MACHINE FOR ELONGATED METALLIC STRIPS

Henry L. Scroggins, 11721 Gilbert St., Garden Grove, Calif. 92646

Filed Apr. 19, 1976, Ser. No. 678,195
Int. Cl.² B21D *11/14*
U.S. Cl. 72—299 **8 Claims**



1. A machine comprising:

a base, said base including an elongated member upon which is mounted a first holder and a second holder, said second holder being movable upon said elongated member toward and away from said first holder and fixable by fixing means in a particular selected position;

first grasping means connected to said first holder, said first grasping means being rotatable in respect to said first holder, said first grasping means adapted to securely connect with an elongated metallic strip;

torque applying means connected to said first grasping means, said torque applying means to effect rotation of said first grasping means;

said second holder including a second grasping means, said second grasping means includes a member secured against rotation in respect to said second holder but capable of a limited amount of longitudinal movement in respect thereto between a retracted position and an extended position, said member securable to the free end of said elongated metallic strip resulting in said elongated metallic strip being held in a taut manner between said first grasping means and said second grasping means; and

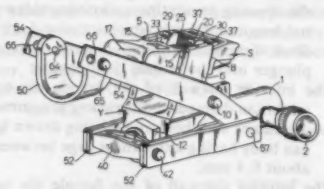
biasing means connected to said second grasping means, said biasing means tending to maintain said member in said retracted position, said biasing means comprises a coil spring assembly, one end of said coil spring assembly connected to the free end of said member with the other end of said spring assembly abutting said second holder, the direction of the force of the spring assembly coincides with the longitudinal center axis of said elongated metallic strip.

4,026,138

CABLE BENDER

Douglas P. Miller, Milwaukee, Wis., assignor to Applied Power Inc., Milwaukee, Wis.

Filed July 12, 1976, Ser. No. 704,186
Int. Cl.² B21D *9/05*
U.S. Cl. 72—321 **4 Claims**



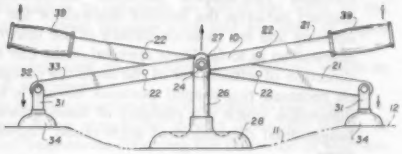
1. A cable bending apparatus comprising an extensible power source, a bending yoke secured to said source, a bending shoe adjustably mounted on said yoke and having means for lockable and releasable adjustment relative thereto, a push bar connected to said extensible power source for being shifted thereby, a linkage pivotally connected intermediate its length to said bending yoke and to said push bar, and a cable engaging saddle pivotally connected to said linkage at one end thereof and for being bodily swung by said linkage upon extension of said power source whereby a cable extending through said bending yoke and engaged by said saddle is caused to bend around said bending shoe.

4,026,139

METAL SURFACE REPAIR TOOL

Max Glaser; Hyman Glaser, both of San Diego; Elmer Glaser, Oceanside; Dennis Glaser, and Donald Glaser, both of San Diego, all of Calif., assignors to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Jan. 21, 1976, Ser. No. 650,946
Int. Cl.² B21D *1/12*
U.S. Cl. 72—389 **3 Claims**



1. A portable tool for removing a dent from a section of a sheet such as the body sheet of a vehicle comprising

a pair of levers mounted together by a rotatable joint at a distance from either end of each lever,

an arm member pivotably mounted to the joint of the levers,

a leg section pivotably mounted to a first end of each lever, said leg section terminating in a cushioned pad, with

a suction cup fitted to the end of the arm member.

4,026,140

FACILITATING REMOVAL OF DEEP DRAWN SHEET METAL CAN BODIES FROM FEMALE DIE STRUCTURE

William T. Saunders, Weirton, WV, assignor to National Steel Corporation, Pittsburgh, Pa.

Filed Feb. 23, 1976, Ser. No. 659,993
Int. Cl.² B21D *22/20*
U.S. Cl. 72—344 **5 Claims**

1. Deep drawing die means for drawing a sheet metal blank into a cup-shaped can body and facilitating removal of the can body after drawing, such can body having a smooth, non-reentrant, cylindrical-configuration sidewall and a unitary endwall

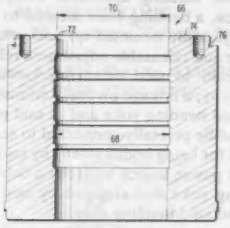
with the longitudinal dimension of such sidewall being at least twice the diamedral dimension of the can body, comprising

male die means including an elongated cylindrical configuration plunger having a smooth exterior sidewall surface uniformly spaced from its central longitudinal axis which is coincident with the longitudinal direction of movement of such plunger during its work and withdrawal strokes,

female die means defining an elongated die opening, such die opening presenting an interior sidewall having a central longitudinal axis which is coincident with the longitudinal direction of relative movement of the male die plunger into the female die opening,

the interior sidewall of the female die opening having a minimum diamedral dimension accommodating the male die means and sheet metal being drawn into a cup-shaped can body having a thickness gage between about 0.15 and about 0.4 mm,

the interior sidewall of the female die opening having a



working surface defining a series of ring-shaped raised portions longitudinally distributed along such working surface,

successive raised portions being separated by a recessed ring-shaped portion, such recessed portions being longitudinally distributed along such working surface,

the longitudinal dimension of such raised ring-shaped portions being selected to provide support to the can body sidewall during drawing to provide a smooth, non-reentrant exterior surface on such can body sidewall with the recessed ring-shaped portions diminishing surface contact between the interior sidewall of the female die opening and the exterior surface of the drawn can body sidewall so as to facilitate removal of the can body in the direction of withdrawal of the male die plunger,

such recessed ring-shaped portions having a longitudinal dimension which is a plurality of times greater than the longitudinal dimension of such raised ring-shaped portions.

4,026,141

METHOD OF AND APPARATUS FOR DETERMINING SURFACE CHARACTERISTICS, SUCH AS COEFFICIENT OF FRICTION, OF A MOVING STRIP OF MATERIAL

Robert E. Merritt, Mount Airy, N.C., assignor to Renfro Corporation, Mount Airy, N.C.

Continuation-in-part of Ser. No. 574,016, May 2, 1975, abandoned. This application Mar. 5, 1976, Ser. No. 664,094

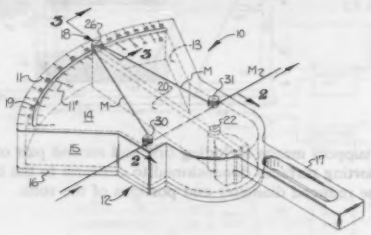
Int. Cl.² G01N *19/02;* **G01L** *5/06*

U.S. Cl. 73—9 **27 Claims**

10. Apparatus for testing a moving elongate tensioned strip of material to determine certain surface characteristics, such as coefficient of friction, thereof with respect to a control sample having known surface characteristics, said apparatus comprising:

means mounting said control sample for sliding frictional engagement of the moving strip of material therewith and for movement in a predetermined path of travel in response to the exertion thereon of unbalanced forces generated by the sliding engagement of the moving strip of material with said control sample;

guide means mounted at predetermined positions in relation to said control sample for guiding the moving strip of material to and from said control sample along respective non-parallel guide paths, so that forces generated by the sliding engagement of the moving strip of material with said control sample will be exerted on said control sample and will cause said control sample to move along its path of travel until the respective angles of said guide paths



become such, with respect to the predetermined path of travel of the control sample, that the forces exerted on said control sample become balanced and movement thereof ceases; and

means operatively associated with said predetermined path of travel for indicating the coefficient of friction of the strip of material determined by the position of said control sample along said path of travel.

4,026,142

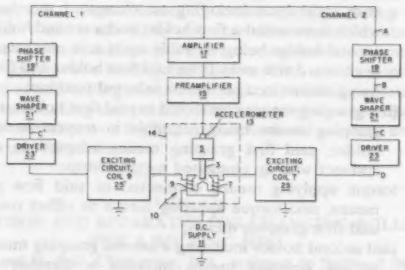
EDDY-CURRENT SYSTEM FOR THE VIBRATION-TESTING OF BLADES

Martin E. Jacobs, Chillicothe, Ohio, assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed May 10, 1976, Ser. No. 685,013

Int. Cl.² G01M *7/00*

U.S. Cl. 73—67.4 **10 Claims**



1. A system for vibration-testing a non-ferrous, electrically conductive cantilevered article by inducing eddy currents therein, said system comprising:

a d.c. power supply;

means including a high-mass mount for supporting an end of said article;

an electromagnet for inducing eddy currents in said article to vibrate the same, said electromagnet including a winding;

a vibration-sensing transducer for generating at an output an a.c. signal whose frequency is equal to the frequency of vibration of said article and whose amplitude is proportional to the amplitude of vibration of said article;

a circuit coupling said winding to the output of said transducer, said circuit including

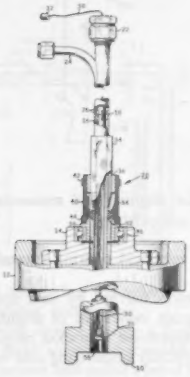
1. a phase-shifting circuit coupled to the output of said transducer;
2. a trigger-pulse generator coupled to said phase-shifting circuit for providing voltage pulses at an output thereof; and
3. an electromagnet-exciting circuit connected to the output of said pulse-generator for alternately and repetitively (a) connecting said winding across said supply to establish an increasing current through said winding and (b) disconnecting said winding from said supply and connecting said winding across a selected impedance to establish through said winding a self-induced decreasing current whose rate of decrease approximates the rate of increase of said increasing current, whereby pulsating d.c. current is established through said winding.

4,026,143

ULTRASONIC SENSOR ASSEMBLY

Charles L. Holland, Escondido, Calif., assignor to General Dynamics Corporation, San Diego, Calif.

Filed Feb. 23, 1976, Ser. No. 660,220
Int. Cl.² G01N *29/00*
U.S. Cl. 73—67.5 R **11 Claims**



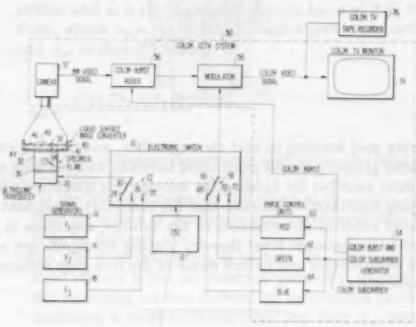
1. A mounting assembly for supporting an ultrasonic transducer within an axial bore a rotatable machine tool assembly which comprises:
- a first tube adapted to be positioned with a hollow rotatable machine tool assembly along the axis of tool rotation;
- an ultrasonic transducer closing one end of said first tube and adapted to be positioned adjacent to the workpiece surface being machined;
- a second tube coaxial with and surrounding said first tube spaced from said first tube by a plurality of spiders;
- means to introduce a fluid between said first and second tubes and to cause said fluid to move toward said workpiece surface in a substantially bubble-free laminar flow column;
- at least a portion of the outer surface of said second tube having an outer than circular cross-section;
- a first sleeve closely surrounding said other than circular cross-section portion and having an inner surface cross-section conforming to said portion; and
- a flexible tubular member connecting said first sleeve to a second sleeve surrounding but spaced from said second tube;
- said second sleeve adapted to be mounted for relative rotation on said rotatable tool assembly by means of a bearing;
- whereby said tool assembly may be rotated while said first and second tubes are maintained stationary without significant transfer of vibration from said tool assembly to said first and second tubes.

4,026,144

APPARATUS FOR THE GENERATION OF POLYCHROMATIC ULTRASONOGRAPHS

Otto R. Gericke, Medfield; Robert C. Grubinskas, Holliston, and Roy A. McKeraghan, Brockton, all of Mass., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 10, 1975, Ser. No. 639,528
Int. Cl.² G01N *29/04*
U.S. Cl. 73—67.6 **11 Claims**



1. In ultrasonic test apparatus wherein images are derived from the ultrasonic interrogation of a test specimen, the combination of:
- an ultrasonic transducer;
- a plurality of signal generators each providing an output signal of a selected different frequency;
- means sequentially cooling said plurality of signal generators to said ultrasonic transducer at a predetermined repetition rate whereby each of said output signals causes said transducer to produce an ultrasonic wave of the respective output frequency of said plurality of signal generators;
- means coupling said plural frequency ultrasonic waves to said test specimen;
- ultrasonic image converter means coupled to said test specimen and being responsive to said ultrasonic waves of different frequencies following the influence of said test specimen thereon to provide a separate ultrasonic image for each frequency of said plurality of signal generators; and
- a polychromatic imaging system operating in synchronism with said sequential coupling means coupled to said image converter and being responsive to the ultrasonic images provided thereby to generate a visual image of a separate color for each frequency of said plurality of signal generators.

4,026,145

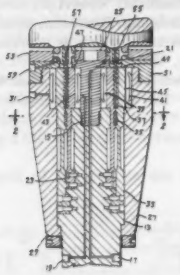
HYDRAULIC GRIP FOR TUBULAR MECHANICAL PROPERTIES SPECIMEN

Andrew Nagy; Ulric S. Lindholm, and Lester M. Yeakley, all of San Antonio, Tex., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Apr. 16, 1976, Ser. No. 677,591
Int. Cl.² G01N *3/04*
U.S. Cl. 73—103 **4 Claims**

1. A hydraulic grip for holding and transmitting multiaxial loads with minimum constraint from a testing machine to a

brittle tubular test specimen, said grip comprising a round elongated vertically oriented stem member for operative attachment to the testing machine, a thick walled cylindrical housing positioned around said stem member, the upper portion of said housing being spaced radially away from said stem member, a locking ring threadably positioned around said stem member against the lowermost end of said housing for



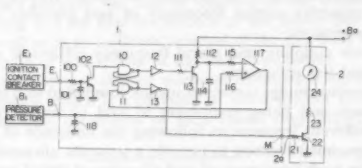
securing said housing to said stem member, and hydraulically actuated gripping means positioned between said housing and said stem member for holding the tubular test specimen while applying multiaxial loads such that the boundary constraint on the load induced deformation of the tubular specimen is reduced to a minimum level thereby playing no significant role in the deformation and failure mode of the free gage section of the specimen.

4,026,146

FUEL CONSUMPTION MEASURING DEVICE

Akira Kuno, Nagoya; Yoshio Shinoda, Okazaki, and Hiroshi Arai, Toyota, all of Japan, assignors to Nippon Soken, Inc., Nishio and Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, both of, Japan

Filed July 31, 1975, Ser. No. 600,803
Claims priority, application Japan, Aug. 7, 1974, 49-90396
Int. Cl.² G01M *15/00*
U.S. Cl. 73—113 **6 Claims**



6. A fuel consumption measuring device comprising:

a battery;

revolutions signal detecting means for generating a signal in synchronism with the revolutions of an internal combustion engine;

intake air amount detecting means for generating a signal corresponding to the flow of air to said engine varying in accordance with the operating conditions of said engine;

a control circuit connected to both of said detecting means for measuring the amount of fuel consumed by said engine in accordance with the output signals of said detecting means;

conversion signal generating means connected to said control circuit for integrating output signals of said control circuit whereby each time a resulting integrated value reaches a predetermined unit quantity of the consumption of fuel an integration operation is repeated to generate a conversion signal in synchronism with said integration operation;

counting means connected to said conversion signal generating means for counting said conversion signal and memorizing the count value thereof with the constantly supplied electric power from said battery; and

display means connected to said counting means and said battery through a key switch for displaying the fuel consumption amount in response to said memorized count value during the closure of said key switch.

4,026,147

THRUST MALALIGNMENT MEASUREMENT APPARATUS

Thomas H. Howell, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 26, 1976, Ser. No. 670,604
Int. Cl.² G01L *5/13*
U.S. Cl. 73—117.4 **6 Claims**

1. Apparatus for aligning and measuring thrust malalignment of a rocket comprising:

a. a support;

b. a 3° gimbal spherical bearing rotatably secured in said support;

c. orienting means carried by said spherical bearing for providing signals indicative of angular displacement of said rocket responsive to rocket motor ignition;

d. means for vertically suspending said rocket to said gimbal bearing; and

e. means for measuring the attitude vector of said rocket responsive to rocket motor ignition including rate sensing means for providing signals indicative of angular rate, and, accelerometer means carried on said rocket for providing signals indicative of angular acceleration; and,

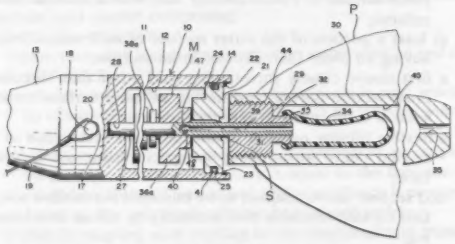
f. means for receiving and recording said signals.

4,026,148

WATER FLOW METER

Shale J. Niskin, 2941 Lucaya, Coconut Grove, Fla. 33133

Filed Apr. 16, 1976, Ser. No. 677,830
Int. Cl.² G01C *21/10*
U.S. Cl. 73—185 **4 Claims**



1. A water flow meter comprising a housing having an

enclosed chamber for containing a fluid, impeller shaft means rotatably mounted on said housing and having one end extending into said chamber, an impeller housing mounted on the other end of said shaft means, said impeller housing having a chamber, an opening in said chamber forming an open chamber, duct means extending along said shaft means from said other end portion to a position within said enclosed chamber, a flexible diaphragm being mounted on said other end portion of said shaft and within said propeller housing whereby fluid in said enclosed chamber may flow into and from said flexible diaphragm upon exposure of said meter to fluctuations in temperature and pressure which effect an expansion and contraction of said fluid in said meter.

4,026,149

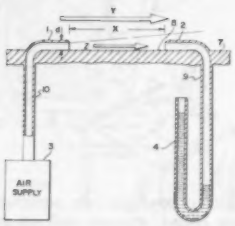
APPARATUS FOR MEASURING THE VELOCITY OF A FLUID

John W. Tanney, Ottawa, Canada, assignor to Canadian Patents and Development Limited, Ottawa, Canada

Continuation-in-part of Ser. No. 835,084, June 20, 1969, abandoned, and a continuation-in-part of Ser. No. 222,269, Jan. 31, 1972, abandoned. This application Jan. 28, 1974, Ser. No. 437,758

Int. Cl.² G01W *1/00*

U.S. Cl. 73—194 R **4 Claims**



1. Apparatus for measuring the velocity of a fluid stream relative to the apparatus, comprising:

a. a fluid jet forming device having a fluid jet orifice,

b. a pressurized fluid source connected to the device to deliver a fluid thereto and cause a jet of fluid to issue from the orifice along a portion of the flow path of the fluid stream, and combine therewith to form a combined flow,

c. a receiver means including a receiver mouth facing the orifice, to be pressurized by the dynamic pressure of said combined flows from the orifice and the fluid stream, within the area bounded by the receiver mouth jet,

d. mounting means connecting the receiver means to the device to space them, along said portion of the flow path of the fluid stream, with said combined flows having a substantially unobstructed flow path along and in contact with a surface of the mounting means extending past the device and the receiver means, with the inlet end of the receiver mouth at a distance of at least five times the minimum distance across the orifice, from the outlet end of the orifice, and

e. indicating means connected to the receiver means for indicating, in terms of the fluid pressure therein, the velocity of the fluid stream, and wherein,

f. the geometry of the fluid jet orifice is derived from

$$R = \frac{Vh_n K}{\mu}$$

where, in consistent dimensions

R is the dimensionless Reynolds number and is in excess of 1700,

V is the velocity of the fluid issuing from the orifice,

K is the density of the fluid issuing from the orifice,

μ is the viscosity of the fluid issuing from the orifice, and

h_n is the hydraulic diameter obtained from

$$h_n = \frac{4A_n}{P_n}$$

where, in consistent dimensions,

A_n is the cross-sectional area of the fluid jet orifice at the outlet, and

P_n is the distance around the perimeter of the fluid jet orifice at the outlet, and

g. when the device is to face downstream of the fluid stream it has an external geometry, exclusive of the surface of the mounting means, defined by its external perimeter enclosing a cross-sectional area less than A_{on} between the limits of a plane located at the outlet of the fluid jet orifice and at a plane parallel thereto located 2 h_n therefrom, where h_n is the hydraulic radius previously defined, and A_{on} is derived from

$$A_{on} = \frac{\pi\,(2.2h_n + Y_n)^2}{4},$$

where, in consistent dimensions and within the limit of Y_n is less than $2h_n$

Y_n is the distance between the plane at the outlet of the fluid jet orifice of the device and the plane at which A_{on} is to be defined, and

when the receiver means is to face downstream of the fluid stream it has an external geometry, exclusive of the mounting means, defined by its external perimeter enclosing a cross-sectional area less than A_{or} between the limits of a plane located at the inlet of the receiver mouth and a plane parallel thereto, by

$$A_{or} = \frac{\pi\,(2.5h_r + Y_r)^2}{4},$$

where, in consistent dimensions and within the limit of Y_r is less than 2 h_r,

Y_r is the distance from the plane at the receiver mouth to the plane at which A_{or} is to be defined,

h_r is the hydraulic radius of the receiver mouth at its inlet as defined by the relationship

$$h_r = \frac{4A_r}{P_r},$$

where

A_r is the area enclosed by the receiver mouth at its inlet, and

P_r is the perimeter of the receiver mouth at its inlet.

4,026,150

MASS FLOW METER

Thomas R. Schmidt, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Feb. 17, 1976, Ser. No. 658,934

Int. Cl.² G01F *1/32*

U.S. Cl. 73—194 VS **5 Claims**

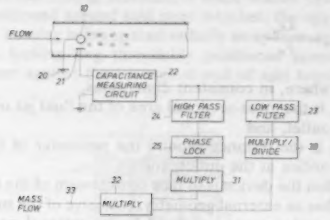
1. A method for determining the mass flow of a fluid comprising:

producing a single measurement, including the change in capacitance resulting from the turbulence in fluid flow produced by a bluff body extending into the flow path and the background capacitance of the fluid;

filtering said single measurement a first time to provide a steady-state dielectric constant measurement;

filtering said single measurement a second time to remove

the steady-state dielectric constant signal to provide an alternating signal related to the turbulence; and



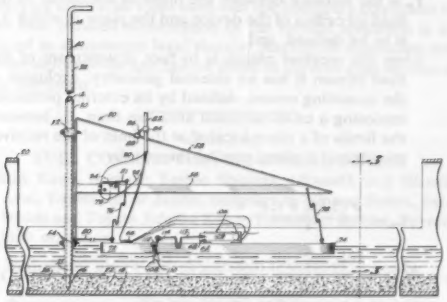
multiplying the turbulence and dielectric constant measurements to compute the mass flow of the fluid.

4,026,151

MEASURING DEVICE FOR WATER FLOW IN A BURIED PIPE

Joseph C. Fitzgerald, 439 Minorca Ave., Coral Gables, Fla. 33134

Filed May 10, 1976, Ser. No. 684,768
Int. Cl.² G01F *1/00, 23/06*
U.S. Cl. 73—194 R **9 Claims**



1. For insertion through a vertical passageway to measure (a) the depth of sediment on the floor of a generally horizontal sewer pipe accessible through the vertical shaft and below the ground level, and (b) the depth of waterflow above the sediment in the pipe, a device comprising:

a shaft with an upper end and a lower end and of an axial length to reach from above the ground level to the pipe floor,

an elongate sleeve having a lower end and said sleeve being of an axial length less than the shaft length and having a portion with an upper end, said sleeve being telescoped over said shaft,

the lower end of the sleeve including a radially extending surface to rest on the surface of sediment in the pipe,

mutually cooperating means included on the upper end zone of the shaft and on the sleeve portion upper end to indicate the axial displacement of the lower end of the sleeve relative to the lower end of the shaft when said radially extending surface rests on the surface of sediment in the pipe,

structure slidably captivated on the sleeve for axial movement along the sleeve above the radially extending surface,

said structure including:

a. a boom extending radially outwardly of said sleeve above the lower end of said sleeve,

b. float means to float on water in the pipe, said float means having a forward zone and a rearward zone,

c. means suspending the float means from the boom, said means suspending including a strand length under tension and supporting said float means when the weight of the float means is acted upon by gravity alone and said tension is reduced when the float means are supported by buoyancy forces exerted by water, and

d. tether means connecting the forward zone of the float means to said structure;

means to raise and lower said structure; and

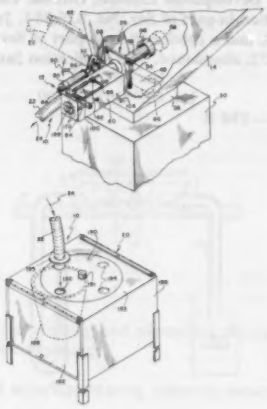
means to sense tension changes in said means suspending including a signal means to signal when tension is reduced in said means suspending and including first circuit means comprising an energy source and said means to sense and said signal means.

4,026,152

AUTOMATIC SAMPLING APPARATUS

Murland L. Taylor, 5300 Main, Parsons, Kans. 67357

Filed Feb. 5, 1976, Ser. No. 655,528
Int. Cl.² G01N *1/10*
U.S. Cl. 73—421 R **9 Claims**



1. For use in apparatus for sampling a flowable solid, a sampling probe comprising a tubular member having one end connected to a downwardly inclined collector tube and said tubular member having an open second end with mounting means being provided adapted to project the tubular member through a conduit so as to expose the second end of the tubular member to the flow of a solid flowing through the latter, a closure cap mounted for reciprocating motion in axial alignment with the second end of the tubular member between a first position closing the open second end of the tubular member and a second position axially spaced from the tubular member, the arrangement being such that a cycle of reciprocation of the cap sequentially opens the second end of the tubular member and then forces ambient solid material into the second end of the tubular member while closing the latter, and means for actuating a cycle of reciprocation of the cap.

4,026,153

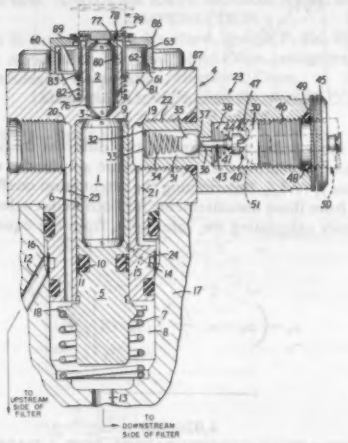
MAGNETIC PRESSURE INDICATOR WITH SAMPLING PORTS

Bernard F. Silverwater, Plainview, N.Y., assignor to Pall Corporation, Glen Cove, N.Y.

Filed Aug. 8, 1975, Ser. No. 602,937
Int. Cl.² F17D *3/00;* **G01N** *1/22;* **G01L** *19/12*
U.S. Cl. 73—421.5 R **20 Claims**

1. A magnetic pressure indicator providing for sampling of fluid without interfering with actuation of the device, comprising a housing and, disposed in combination in the housing, a first magnetic means in one chamber spaced from and arranged to react with a second magnetic means in a second chamber so long as the two magnetic means are within their mutual magnetic fields of force; first bias means to retain the

first magnetic means towards or away from the second magnetic means; second bias means to propel the second magnetic means from a first position to an indicating position whenever the spacing distance between the two magnetic means is changed; the first magnetic means being movable in response to changes in pressure, and normally resiliently biased by the first bias means toward or away from the second magnetic means by a predetermined force, and the second magnetic means being normally resiliently biased by the second bias means in a direction away from the first means by a force capable of overcoming the force of magnetic reaction with the first magnetic means whenever the first and second magnetic means are spaced by a predetermined distance; at least two



fluid line connections, one connection leading to said first chamber having the first magnetic means and the other connection leading to said first chamber on the other side of the first magnetic means, pressure in said line connections tending to move the first magnetic means in opposite directions; at least one sampling port in fluid flow connection with one of the fluid line connections; and valve means in the housing connected across the fluid flow connection from the sampling port to the other fluid line connection and selectively movable between open and closed positions, normally closing off the port, and accessible from outside the indicator to be activated for movement to an open position for removing a fluid sample via the port.

4,026,154

SAMPLE TAKING APPARATUS

Hartmut Pfeiffer, Hesse; Manfred Hilbig, and Wolfgang Krella, both of Neubeckum, all of Germany, assignors to Polysius AG, Neubeckum, Germany

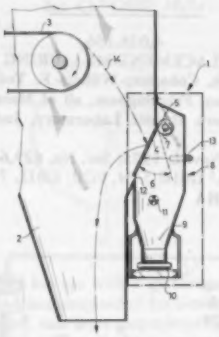
Filed Apr. 10, 1975, Ser. No. 566,783

Claims priority, application Germany, Apr. 23, 1974, 7414019[U]

Int. Cl.² G01F *23/00*; G01N *1/20*

U.S. Cl. 73—423 R **5 Claims**

1. Apparatus for taking samples from a continuous stream of material discharged from a conveyor along a downwardly curvilinear discharge path, said apparatus comprising a first material receiver and a second material receiver communicating with one another via a substantially planar aperture, one of said receivers constituting a sample receiver, said aperture having a width and a height at least as great as the width and thickness of said stream and being located at a level such that material tranversing said path normally would pass freely through said aperture; a planar gate having a free end; means mounting said gate at its opposite end for rocking movements between first and second positions, said gate having a width at least as great as the width of said stream and an area of such size relative to the area of said aperture as to be capable of blocking the latter whereby said material may impinge on said gate when the latter is in one of said positions; wear resistant means on that side of said gate on which said material may impinge; means in said sample receiver for sensing the level of material therein; conveyor means communicating with said



sample receiver for conveying material therefrom; and means connected to said gate for rocking the latter between said positions, said gate when in one of said positions blocking said aperture with the free end of said gate on one side of the plane of said aperture and when in the other of said positions clearing said aperture and enabling said stream of material to pass through said aperture.

4,026,155

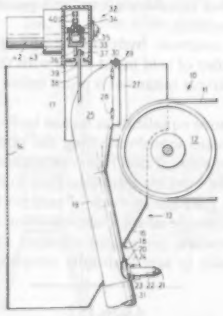
CONVEYOR SAMPLER

John Abraham Joseph, 16 Auckland St., Gladstone, Queensland, Australia

Filed May 20, 1976, Ser. No. 688,280

Int. Cl.² G01N *1/20*

U.S. Cl. 73—423 R **2 Claims**



1. A conveyor sampler including:

a main chute;

an inlet to the main chute adapted to receive materials discharged substantially horizontally thereinto by a conveyor;

an outlet from the main chute;

a sample chute within the main chute pivoted, below the inlet to the main chute, about an axis substantially parallel to the direction of flow of the materials discharged into the main chute;

a cutter head on the upper end of the sample chute;

a mouth in the cutter head directed towards the flow of materials into the main chute, leading downwardly to the sample chute, the sides of the mouth being substantially

radial to a point on the axis of the pivot of the sample chute;

means for adjustably varying the effective width of the mouth, and

thruster means adapted to oscillate the sample chute to move the cutter head across the flow of materials into the main chute.

4,026,156

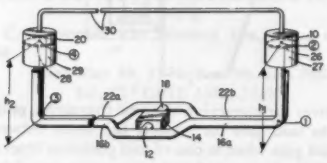
VERTICAL DISPLACEMENT MEASURING APPARATUS

Philip N. Bowditch, Cohasset; William E. Toth, Bolton, and Arthur Grossman, Framingham, all of Mass., assignors to The Charles Stark Draper Laboratory, Inc., Cambridge, Mass.

Filed Nov. 6, 1975, Ser. No. 629,640

Int. Cl.² G01C *5/04, 9/20;* **G01L** *7/18*

U.S. Cl. 73—432 HA **9 Claims**



1. Apparatus for measuring the vertical displacement between a remote point and a reference point, comprising:

A. a differential transducer having a two input port sensor and including means for generating a signal representative of the difference in pressure applied to the input ports of said sensor,

B. a reference reservoir means and a remote reservoir means, each reservoir means having a liquid working fluid disposed therein, said working fluids each having a gas-liquid interface in its reservoir means and being disposed at points at and below said interface,

C. a reference reservoir hydraulic coupling means for coupling one of said input ports with the interior region of said reference reservoir means at a point below its working fluid interface,

D. a remote reservoir hydraulic coupling means for coupling the other of said input ports with the interior of said remote reservoir means at a point below its working fluid interface,

E. vapor pressure equalization means including a pneumatic coupling means interconnecting the portion of the interior region of each of said reservoir means at a point above its respective working fluid interface to maintain substantially equal pressure in each of said portions, and

F. volumetric temperature compensation means for offsetting temperature dependent changes in volume of said working fluids in said hydraulic coupling means.

4,026,157

METHOD OF QUANTITATIVELY DETERMINING THE GRAIN SIZE OF SUBSTANCES

Klaus Goebbels, Saarbrucken, Germany, assignor to Fraunhofer-Gesellschaft zur Forderung der angewandten Forschug e.V., Munich, Germany

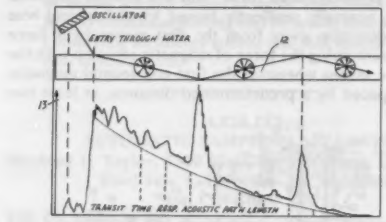
Filed Mar. 18, 1976, Ser. No. 667,940

Claims priority, application Germany, Mar. 18, 1975, 2511750

Int. Cl.² G01N *15/02, 29/00*

U.S. Cl. 73—432 PS **3 Claims**

1. A method of quantitatively determining the grain size d of substances having an ultrasound attenuation coefficient $\alpha = \alpha_A + \alpha_S$, wherein the absorption coefficient α_A depends linearly upon the frequence f of the ultrasound ($\alpha_A = a_1 f$) and the coefficient of scatter α_S is $H.D^3.f^4 = a_4.f^4$, H being a constant and based upon density, speed of sound and anisotrophy, by measuring the pressure amplitude $A_R(x)$ of the scattered sound as a function of the transit time of the sound through the specimen, and averaging over limited regions of structure by relative continuous or discontinuous movement between the source of the sound and the specimen, the invention consisting in introducing ultrasound of two different frequencies f_1 and f_2 and measuring the sonic pressure amplitudes of both frequencies f_1 and f_2, determining the attenuation coefficients α_1 and α_2 from these measurements for both frequencies f_1 and f_2 and finally calculating the value of a_4 from the equation



$$a_4 = \left(\alpha_2 - \alpha_1 \cdot \frac{f_2}{f_1} \right) / f_2 \cdot (f_2^4 - f_1^4)$$

4,026,158

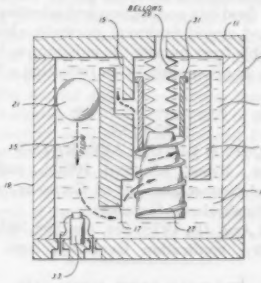
TEMPERATURE COMPENSATION FOR A DAMPED FLUID PROOF MASS ACCELEROMETER

William Charles Albert, Boonton, and Bart Joseph Zoltan, Old Tappan, both of N.J., assignors to The Singer Company, Little Falls, N.J.

Filed Feb. 24, 1976, Ser. No. 660,825

Int. Cl.² G01P *3/26, 7/00*

U.S. Cl. 73—497 **6 Claims**



1. In an accelerometer utilizing proof masses disposed in a damping fluid, said proof masses operating against the damping fluid such that when a proof mass is subjected to a G force it causes said fluid to follow a predetermined flow resistance path from below the proof mass to a point above the proof mass, with a bellows and helix arrangement provided to control the length of the flow path with changes in temperature, the area above said bellows being in communication with the point above the proof mass and the area below said bellows being in communication with the area below said proof mass, and the normal flow path being from an area below to an area above said helix, means to prevent a rapid movement of said helix with a sharp temperature change from causing a fluid

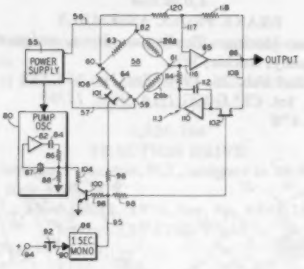
flow which will affect the position of said proof mass comprising:

means establishing a low resistance flow path between the area above said helix and the area below said helix.

4,026,159
FLUIDIC ANGULAR RATE SENSOR NULL ERROR COMPENSATION

Donald H. Isakson, West Hartford; Joseph P. Hu, Easton, and Max A. Schaffer, Fairfield, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Feb. 23, 1976, Ser. No. 660,961
Int. Cl.² G01P *15/08*
U.S. Cl. 73—516 LM **9 Claims**



1. In a fluidic angular rate sensor of the type having a pair of temperature-sensitive resistive elements disposed in the path of a stream of fluid provided by a jet, the fluid being pressurized by pumping means, sensing means including said temperature-sensitive resistive elements and a pair of reference resistors arranged in a bridge circuit feeding an amplifier to provide an output indicative of the angular rate being sensed as a function of misbalance of said bridge induced by differential cooling of the temperature-sensitive resistive elements due to variations in the relative direction of the stream of fluid as a result of angular rates undergone by the sensor, the improvement comprising:

first means associated with said pumping means for reducing the pumping action thereof to a point where the stream of fluid has a negligible cooling effect on said temperature-sensitive resistive elements at any angular rate, said means rendered operable in response to a selectively applied first input signal thereto;

second means associated with said sensing means and selectively operable in response to a second input signal applied thereto offsetting the output of said sensing means by an amount determined to equal the difference between the static null and the dynamic null of said sensor at the time of its manufacture and initial calibration;

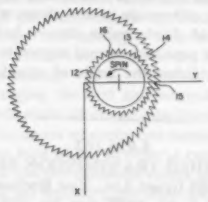
third means associated with said amplifier for providing an integrated negative feedback signal from the output thereof to an input thereof, said means being selectively actuable by a third input signal applied thereto to integrate the output of said amplifier and provide an opposing input signal thereto until the integrated input signal is sufficient to drive the output of said amplifier to zero, said means when thereafter not actuated, maintaining the integrated signal over a time interval which is significant with respect to the expected time over which said sensor is to function with null error compensation; and

selectively operable means for providing all three of said input signals.

4,026,160
NON-TUMBLING LIMIT STOP PROVIDING A MECHANICAL SUPER CAGE

Hughes M. Zenor, Rolla, Mo., and John C. Weaver, Ridgecrest, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 6, 1976, Ser. No. 683,997
Int. Cl.² G01C *19/54*
U.S. Cl. 74—5.4 **9 Claims**



1. A limit stop for use with a gyroscope which is at least partially encased and suspended for limited movement relative to a structure, said limit stop comprising:

a frictional element attached to a gyroscope case; and

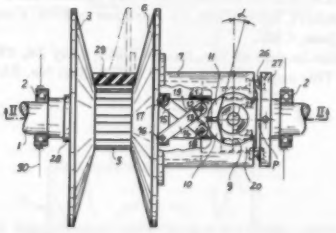
a motion limiting member having a frictional contact surface, said motion limiting member being attached to said structure, said motion limiting member defining a limit of gyroscope motion relative to said structure, and said frictional contact surface positioned to contact said frictional element at a limit of said gyroscope relative movement;

so arranged and constructed that contact between said frictional contact surface will cause said gyroscope to precess away from said limit stop and thus permit controlled slewing of the gyroscope spin axis.

4,026,161
VARIABLE SPEED TRANSMISSION AND ACTUATOR THEREFOR

Hilmar Vogel, Gartenstrasse 1E, Krailling, Germany (8033)

Continuation-in-part of Ser. No. 482,633, June 24, 1974, abandoned. This application Apr. 12, 1976, Ser. No. 675,904
Int. Cl. F16h *9/00*, *9/18*
U.S. Cl. 74—230.17 M **5 Claims**



1. A variable-pitch sheave adapted to be mounted on a shaft having and rotatable about an axis, said sheave comprising:

a first sheave half axially fixed to said shaft but rotatable thereon;

a second displaceable sheave half axially shiftable on said shaft toward and away from said fixed sheave half and angularly fixed to said first sheave half;

a sleeve carried on said displaceable sheave half and surrounding said shaft, said sleeve being formed with a seat having an inner wall formed as a surface of revolution with a generally radial axis;

a generally radial pressure pin keyed to said shaft and centered in said seat;

a pair of pressure segments in said seat disposed symmetri-

cally to either side of a plane passing through said axis and longitudinally through said pin, each segment having a curved outer surface slidable around said inner wall and a generally planar inner surface tangentially engaging said pin;

at least one pivot on said first sheave half; and

a apir of rigid links each pivoted at one end at said pivot and at the other end on a respective pressure segment, said links lying at an angle to said plane and extending generally axially, said segments and said links being generally symmetrical to either side of said plane, whereby the axial position of said displaceable sheave half on said shaft determines the positions of said segments in said seat and therefore establishes the angle of attack of said pin on said segments.

4,026,162

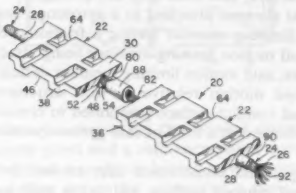
TOOTHED TRANSMISSION BELT

Winfred M. Berg, 89 Grant Ave., East Rockaway, N.Y. 11518

Filed July 23, 1975, Ser. No. 598,410

Int. Cl.² F16G *1/28*

U.S. Cl. 74—231 C **11 Claims**



1. Drive transmission means comprising an elongated body portion comprising at least one cable, covering means for the cable, and belt means including a plurality of teeth; said covering means including a plurality of guide portions formed around at least one portion of the surface of the cable with at least one such guide portion positioned between at least one pair of adjoining teeth of said plurality of teeth to form an intermittent longitudinal belt guide means; in which the cable covering means and the belt means are integral.

4,026,163

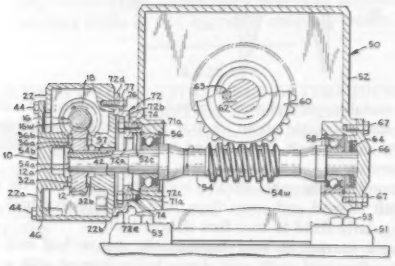
DOUBLE SPEED REDUCER UNIT ASSEMBLY

Clifton S. Merkert, Springfield, Pa., assignor to FMC Corporation, San Jose, Calif.

Continuation-in-part of Ser. No. 363,468, May 24, 1973, abandoned. This application Jan. 15, 1975, Ser. No. 541,300

Int. Cl.² F16H *1/16*

U.S. Cl. 74—425 **13 Claims**



1. A compound speed reducer comprising a main speed reducer unit having a housing and a worm shaft mounted in said housing for rotation on an axis with an end portion of the shaft extending from the housing, an auxiliary unit having a housing with an opening in said housing, means to secure said auxiliary housing to said main housing with said opening aligned about said rotational axis of the main worm shaft, a worm shaft journaled in the auxiliary housing, said auxiliary worm shaft having a worm thereon, a worm gear mounted in the auxiliary housing, said auxiliary worm gear having a central bore therein, and means radially spaced from said central bore to support said auxiliary worm gear in the auxiliary housing in engagement with said worm and with said central bore in approximate alignment with the opening in the auxiliary housing prior to receipt of the main worm shaft to permit quick and convenient insertion of said main worm shaft into said auxiliary worm gear for easy connection of the auxiliary unit onto the main unit, said auxiliary worm gear and said main worm shaft being supported independently of the auxiliary housing in directions radial to the main worm shaft after such field connection.

4,026,164

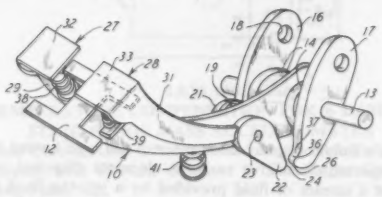
BRAKE PEDEL ASSEMBLY

Robert Eugene Mozingo, Burlington, Iowa, assignor to J. I. Case Company, Racine, Wis.

Filed Feb. 26, 1976, Ser. No. 661,712

Int. Cl.² G05G *1/14, 9/00, 11/00*

U.S. Cl. 74—478 **5 Claims**



1. A brake pedal assembly comprising a main brake pedal, an auxiliary right hand brake pedal and an auxiliary left hand brake pedal with each pivotally associated with and separately movable relative to said main brake pedal, a respective brake actuator movably mounted relative to each said auxiliary pedal, and a respective interlock member operatively associated with each of said auxiliary pedals and disposed adjacent said respective brake actuator and being normally free of connection with said respective brake actuator and being movable in accordance with the movement of said respective auxiliary brake pedal and thereby be interconnectable between each said actuator and said auxiliary pedals upon depressing the latter for respectively interconnecting said main brake pedal with the respective said actuator in response to depressing a respective one of said auxiliary pedals.

4,026,165

DUAL BRAKE ACTUATING HANDLE BARS AND BICYCLE NECK ASSEMBLY

Joseph Papp, 7012 Arbutus, Huntington Park, Calif. 90255

Filed Jan. 12, 1976, Ser. No. 648,197

Int. Cl.² B62K *21/12;* **B62L** *3/00;* **G05G** *11/00*

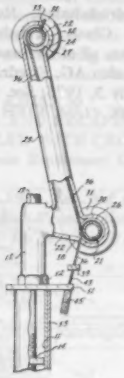
U.S. Cl. 74—480 R **6 Claims**

1. A dual handle-bar and bicycle neck assembly for a bicycle having a sleeve on a fork rotatably mounted within the tube of a frame, said assembly comprising:

a stem internally engaging said sleeve;

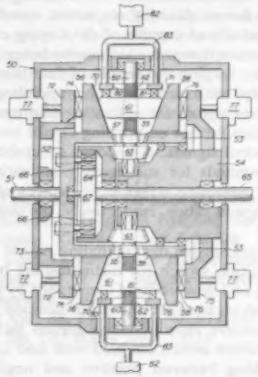
a pair of spools, each mounted to said stem, one above the other;

a handle-bar rotatably mounted within each spool;
a cable attached to both handle-bars;



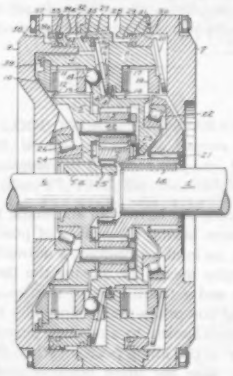
a whiffletree attached to said cable and disposed below said spools; and
a pair of brake wires attached to said whiffletree.

4,026,166
TRACTION DRIVE
Andrew Jackson, Princeton, N.J., assignor to Mobil Oil Corporation, New York, N.Y.
Filed Feb. 2, 1976, Ser. No. 654,125
Int. Cl.² F16N *15/16*
U.S. Cl. 74—691 **12 Claims**



1. An infinitely-variable speed ratio traction drive which comprises:
aa. a housing
bb. a first drive input carrier journalled for rotation within the housing,
cc. a second drive input carrier journalled coaxially with the first input carrier for rotation within the housing,
dd. means for driving the second input carrier at the same rotational speed as but in the opposite direction to the first input carrier,
ee. a first drive input cone having a conical drive face, mounted on the first input carrier for rotation therewith and axial movement on the carrier,
ff. a second drive input cone having a conical drive face opposed to the conical drive face of the first input cone, the cone angle of the drive face of the second cone being equal to that of the drive face of the first cone, the second input cone being mounted on the second drive input carrier for rotation therewith and axial movement thereon,
gg. a plurality of intermediate drive shafts journalled in the housing, the shafts extending perpendicularly to the axis of the input cones and being disposed axially and stationary between the input cones,
hh. an intermediate drive cone mounted on each intermediate drive shaft for rotation therewith and moveable along the shaft, all the intermediate drive cones being uniform size and shape and having a cone angle equal to the complement of the cone angle of the conical drive faces of the input cones,
ii. means for urging the first and second input cones relatively towards each other and into contact with the intermediate drive cones whereby line contact between (i) the conical drive face of the first input cone and the conical drive face of the intermediate cones and (ii) the conical drive face of the second input cone and the conical drive face of the intermediate cones takes place,
jj. means for urging the intermediate cones along their respective intermediate drive shafts into contact with the first and second input cones,
kk. an output shaft
ll. means for driving the output shaft from the intermediate shafts.

4,026,167
PLANETARY TRANSMISSION
James M. Archer, 2917 Grand Ave., Billings, Mont. 59102
Filed May 2, 1975, Ser. No. 574,090
Int. Cl.² F16H *57/10*
U.S. Cl. 74—785 **36 Claims**



1. A transmission comprising a rotatable input member; a rotatable output means; a planetary gear set having a rotatable first element connected to the input means, a rotatable second element connected to the output means and a rotatable third element, a first engageable and disengageable friction device for locking and unlocking said third element to a non-rotatable transmission element; second engageable and disengageable friction device for connecting together and disconnecting said second and third elements, the arrangement being such that the transmission is shiftable by operation of said first and second friction device between two modes of operation, one of said modes arising when said third element is non-rotatably locked to a non-rotating transmission element and when said first and second elements rotate and the other mode arising when all said elements rotate, biasing means rotatable with said second and third elements when said second and third

elements are connected together by said second friction device for applying a biasing force to said second friction device to engage the same, and permanently non-rotating axially adjustable means movable between a first position out of engagement with said biasing means and a second position in direct engagement with said biasing means to remove the biasing force from said second friction device, whereby when said first and second friction devices are operated simultaneously to effect shifting from one mode to another mode the resulting sliding friction forces between said adjustable means and said biasing means exist for only a short period of time.

4,026,168

EXHAUST GAS PURIFICATION SYSTEM

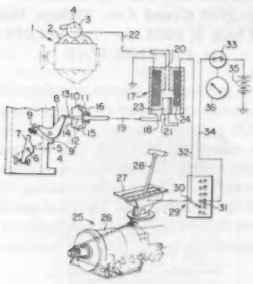
Nobuyuki Kobayashi, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Continuation of Ser. No. 489,542, July 18, 1974, abandoned. This application Apr. 9, 1976, Ser. No. 675,272

Claims priority, application Japan, Jan. 28, 1974, 49-11163[U]

Int. Cl.[2] B60K *41/18;* **F02D** *31/00*

U.S. Cl. 74—860 **3 Claims**



1. In an automobile having an automatic transmission with a selector system having a plurality of positions including a drive position, an intake manifold, a normally closed throttle valve, accelerator means for moving the throttle valve to an open position and a throttle valve stop mechanism, the improvement that comprises means normally biasing said throttle valve stop mechanism to a position permitting the throttle valve to return to the idling position when the selector is in a position other than the drive position and the accelerator means is in repose, said means comprising a vacuum line between said intake manifold and said biasing means, the biasing means being responsive to vacuum in said line to overcome the biasing means and to move said stop mechanism to a position preventing said throttle valve from returning to the idling position when the selector is in the drive position and the accelerator means is in repose and means responsive to the engine vacuum and the position of said selector to block said vacuum line, said blocking means comprising a normally closed solenoid valve, and an electrical circuit to control said solenoid including a switch actuated by the selector system, said circuit being connected so that the solenoid blocks the vacuum line in response to the position of the selector system; a vacuum control valve actuated by the level of engine vacuum and connected between said solenoid valve and the engine intake manifold so that solenoid valve is connected to the manifold only when its vacuum is in excess of a predetermined magnitude.

4,026,169

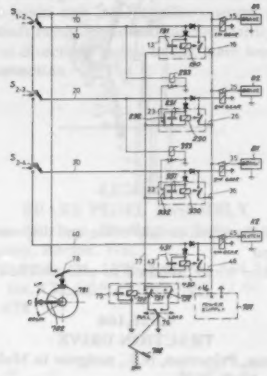
ELECTRO-HYDRAULIC CONTROL SYSTEM FOR SPEED-CHANGING MECHANISM SWITCHABLE UNDER LOAD

Willi Kühnle, Friedrichshafen; Heinz Wendler, Meckenbeuren; Manfred Glaser, Friedrichshafen, and Harald Breisch, Kressbronn, all of Germany, assignors to Zahnradfabrik Friedrichshafen AG, Friedrichshafen, Germany

Filed July 3, 1975, Ser. No. 593,062

Int. Cl.[2] B60K *41/04;* **F16H** *5/20, 5/58, 5/80*

U.S. Cl. 74—861 **10 Claims**



1. In a speed-changing mechanism with at least three stages comprising each a hydraulic coupling element individually activable to the exclusion of the coupling elements of the other stages for establishing respective speed ratios between an engine and a load capable of developing either positive or negative reaction torques, said engine being provided with a controller for varying the supply of fuel thereto, said stages being provided with electrical valve-operating means responsive to control signals for activating said coupling elements, the mechanism further comprising circuit means for generating said control signals in response to upshifting and downshifting commands for successively activating the coupling elements of adjoining stages in sequences of increasing and decreasing speed ratios, respectively, the combination therewith of:

selection-responsive discriminating means including a first two-position switch for distinguishing between said upshifting and downshifting commands by alternately occupying an up position and down position;

load-responsive discriminating means including a second two-position switch coupled with said controller for distinguishing between positive and negative torques by alternately occupying a load position and a pull position; and

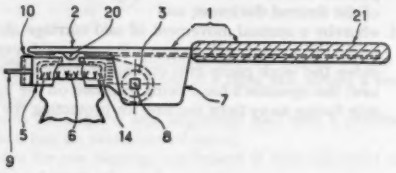
switch means in said circuit means jointly controlled by said selection-responsive discriminating means for establishing a first changeover condition in response to a concurrence of said up position with said pull position, indicative of a coincidence of upshifting commands with negative reaction torques, and in response to the concurrence of said down position with said load position, indicative of a coincidence of downshifting commands with positive reaction torques, and for establishing a second changeover condition in response to a concurrence of said up position with said load position, indicative of a coincidence of upshifting commands with positive reaction torques, and in response to a concurrence of said down position with said load position, indicative of the coincidence of downshifting commands with negative reaction torques, said first changeover condition introducing a

predetermined delay period between deactivation of a previously activated coupling element of an adjoining stage and activation of a coupling element of a selected stage, said second changeover condition causing activation of a coupling element of a selected stage substantially concurrently with deactivation of a previously activated coupling element of an adjoining stage.

4,026,170
MANUAL ENCAPING AND RECAPING DEVICE FOR BOTTLES SEALED WITH CROWN CAPS

Robert Gerard, 14, avenue Ruchonnet CH-1003, Lausanne, Switzerland

Filed Apr. 7, 1976, Ser. No. 674,318
Claims priority, application France, Apr. 8, 1975, 75.10970
Int. Cl.² B67B *5/00, 7/16*
U.S. Cl. 81—3.43 **7 Claims**



1. A manual uncapping and recapping device for bottles with a crown cap closure, comprising:

a cap-tightening and extracting ring comprising two semicircular parts connected together at one end and having parallel extensions at the other end, each extension having a perforation therein,

a lever handle having a handgrip at one end and a pressure element at the other end, said lever handle, substantially intermediate said two ends, having lateral supports extending downwardly from each side thereof;

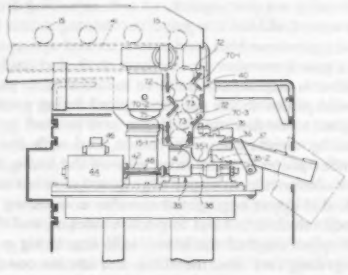
a reverse-pitch two-thread shaft fixedly connected between said lateral supports, the perforations of said extensions each engaging one thread of said two-threaded shaft,

whereby downward and upward pivoting, of said lever handle causes contraction or expansion of the opening of said ring by tightening or loosening the two semicircular parts thereof.

4,026,171
SHUTTLE TRANSFER MECHANISM

Edward Frank Kubacki, Arlington Heights; Harold Charles Lemke, Grayslake; George Alan Schmidt, Barrington; Vance Burton Gold, Lombard, and Harold James Jessogne, Arlington Heights, all of Ill., assignors to American Can Company, Greenwich, Conn.

Filed Apr. 28, 1975, Ser. No. 572,187
Int. Cl.² B23B *5/14, 13/10*
U.S. Cl. 82—102 **7 Claims**



1. In a machine having a cyclically operable tool at a work station and wherein a can body is to be moved forwardly in one direction from a ready position to a loading station and then transferred bodily from the loading station laterally to the work station which is located on one side of the loading station;

a shuttle reciprocal in said one direction between a retracted position and an advanced position, said shuttle having a first pocket presented to the ready position when the shuttle is in a retracted position, and having a second pocket located at the loading station when the shuttle is in its retracted position to receive a can body transferred thereto from the work station;

an extendable normally retracted loading plunger at the loading station positioned to be aligned with the first pocket when the shuttle is in its advanced position to transfer a can body therein to the work station bodily as aforesaid by extending the loading plunger, the path of the plunger being horizontal and transverse to the path of the shuttle;

means to bodily transfer the can body from the work station to the second pocket in the retracted position of the shuttle;

a cylinder rod operated by fluid pressure for reciprocating the shuttle and having an idle period in the advanced position of the shuttle during which said plunger is extended;

said second pocket having an open leading end enabling a can body therein to be discharged therefrom by its own momentum as the shuttle stops in its advanced position;

a supply magazine having a feed opening positioned to feed the can body by gravity drop from ready position to the first pocket in the shuttle when the shuttle is retracted;

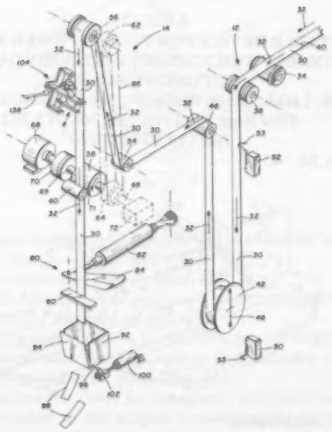
said shuttle being guided for movement beneath the path of the loading plunger, whereby the shuttle may be retracted while the loading plunger is in its extended position;

said shuttle having a surface thereon to block the feed opening of the supply magazine in the advanced position of the shuttle, said pockets being separated by a land above which the plunger is positioned and said land lying in a plane above the lower surface of said second pocket.

4,026,172
BELT LOOP TRIMMING APPARATUS

Joseph W. A. Off, Irving, and Judson Horace Early, Dallas, both of Tex., assignors to Hagger Company, Dallas, Tex.

Filed Mar. 17, 1975, Ser. No. 559,340
Int. Cl.² B26D *7/06, 5/34*
U.S. Cl. 83—106 **14 Claims**



1. An apparatus for forming belt loops from an elongated

loop string having a backing material and with shorter lengths of cloth wrapped about the exterior of the backing material and forming splices between adjacent lengths of cloth, the apparatus comprising in combination:

an input portion comprising a dancer roller engaging said loop string, said dancer roller being movably mounted to form a loop in said loop string, an idler roller engaging loop string extending from said dancer roller, means sensing the position of said dancer roller whereby the amount of material stored in said input portion can be regulated; and

a metering and trim portion positioned to receive the loop string exiting said input portion and operatively associated with said means for sensing the position of said dancer roller to disengage said metering and trim portion when the amount of loop string stored in said input portion is less than a set minimum, said metering and trim portion having a pair of driven rollers engaging said loop string and being connected together by an endless belt, a tension roller compressing said loop string against the second of said driven rollers, said second driven roller being operatively connected to a metering drive motor through a clutch/brake whereby said metering drive motor may be disconnected from said second driven roller and the rotation of the roller terminated, a rotary encoder connected to said second driven roller to generate pulses as said second driven roller rotates, a cutting apparatus comprising a fixed knife blade adjacent to the path of said loop string and a movable knife blade selectively movable to engage said fixed knife blade and shear said loop string, an actuator cylinder operatively associated with said movable knife blade which, when actuated, moves said knife blade to shear said loop string, said cylinder being operatively associated with said rotary encoder and said clutch/brake to shear said loop string at predetermined lengths required by said belt loops, a foot positioned adjacent the path of said loop string between said first and second driven rollers, a lamp/photosensor positioned adjacent said foot for directing a beam of light onto and for receiving light reflected from the surface of said foot, said foot being positioned so that splices in said loop string will engage said foot and interrupt the light beam, means operatively associated with said lamp/photosensor to retract said foot upon the presence of a splice in said loop string and for operating said cutter actuator cylinder to sever said loop string at a point adjacent the splice in said loop string, and a deflector positioned adjacent said cutter for deflecting and sorting said splices from said precut belt loop lengths.

4,026,173

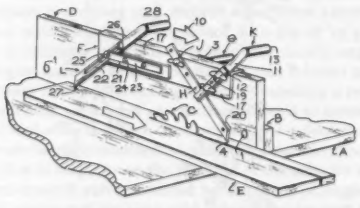
ADJUSTABLE DEVICE FOR FEEDING WORK PIECES OF DIFFERENT THICKNESSES PAST A RIP SAW FOR CUTTING PURPOSES

Lester R. Livick, 15106 Beatty St., San Leandro, Calif. 94579

Filed Aug. 11, 1976, Ser. No. 713,392

Int. Cl.² B27B *25/10*

U.S. Cl. 83—421 **3 Claims**



1. In combination:

a. a table having a slot with a portion of a disc rip saw projecting therethrough and a fence paralleling the adjacent face of said rip saw and being adjustble toward and away therefrom;

b. a guide rail securable to said fence and adjustable therewith;

c. a carriage U-shaped in cross section and slidable along the top of said guide rail and having two sides slidably contacting the adjacent sides of said guide rail;

d. a work piece engaging and moving member pivotally and adjustably carried by the side of said carriage disposed nearest to the rip saw and a handle connected to and extending away from the opposite side of said carriage so as to be disposed on the opposite side of said guide rail from the saw;

e. an adjustabie stop supported on the same carriage side as said work-engaging member and contacting said member after the latter has been adjusted for the work piece thickness for holding it in the desired angle so that the pointed end of said member will contact the work piece of the desired thickness; and

f. whereby a manual movement of said carriage along said guide rail toward said rip saw will cause said member to move the work piece into cutting engagement with the saw, the operator's hand being disposed on the guide rail side facing away from the saw for protecting the hand.

4,026,174

GUARD FOR CIRCULAR SAW

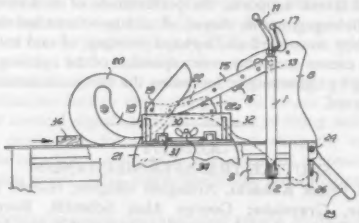
Justo Vidaller Fierro, Calle Felipe de Paz, 8, Barcelona, Spain

Filed Dec. 8, 1975, Ser. No. 638,671

Claims priority, application Spain, Dec. 18, 1974, 208471

Int. Cl.² B27G *19/02*

U.S. Cl. 83—438 **14 Claims**

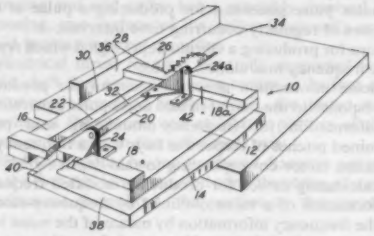


1. In a guard for the blade of a circular saw, the blade having an exposed arcuate portion, said portion having a front edge against which workpieces to be sawed are fed an opposite rear edge and an upper edge, the upper edge extending between and being higher than said front and rear edges, the guard comprising support means, an arm extending from said support means, at least one position retaining means for said arm, a front guard member, and means on said arm connecting said front guard member to said arm such that said front guard member is displaceable relative to said arm, to permit passage of workpieces to be cut, said guard being constructed and adapted to be mounted with the arm located by the position retaining means above the blade, and with the front guard member protecting the front edge of the blade, the improvement comprising an upper edge guard member carried by the arm, said upper edge guard member comprising two limbs in spaced relation, to lie at respective sides of, and thereby guard said upper edge of the blade, said arm being a double arm, comprising two arm members and means constraining said members in spaced relation, and wherein the guard further comprises means mounting said upper edge guard member to said arm, between said two arm members thereof.

4,026,175
TABLE SAW WOOD EDGING ALIGNMENT TOOL

Robert P. Bisey, 2339 Spruce St., Seaford, N.Y. 11783

Filed Aug. 24, 1976, Ser. No. 717,042
Int. Cl.² B27B 5/04
U.S. Cl. 83—442 6 Claims

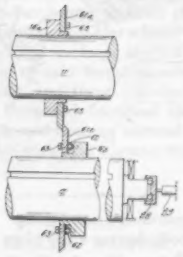


1. A table saw edging alignment tool for edging a piece of wood with a circular saw blade of a table saw having a fence comprising:
   a. means for aligning said alignment tool with a predetermined line on said piece of wood;
   b. means for non slipping attachment of said alignment tool with said piece of wood;
   c. means for moving said means for aligning out of the way of said circular saw blade; and
   d. means for guiding said alignment tool and said piece of wood along said fence.

4,026,176
MEANS FOR SETTING SLITTER HEADS

Gunther Weiskopf, New York, N.Y., assignor to S&S Corrugated Paper Machinery Co., Inc., Brooklyn, N.Y.

Continuation-in-part of Ser. No. 456,012, March 29, 1974, Pat. No. 3,951,024. This application Oct. 20, 1975, Ser. No. 623,822
Int. Cl.² B26D 1/24
U.S. Cl. 83—502 8 Claims

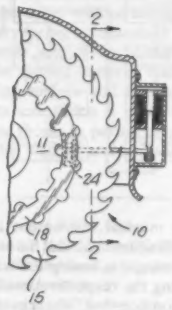


1. Apparatus for longitudinally slitting a web traveling along a feed path, said apparatus including a drive shaft extending transverse to said path, first and second tool supporting heads mounted on said shaft for adjusting movement along the length of said shaft and to be rotated thereby, selectively operable locking means for maintaining said heads in adjusted positions along the length of said shaft while the latter rotates, another drive shaft parallel to said drive shaft, third and fourth tool supporting heads mounted on said another shaft for adjusting movement along the length of said another shaft and to be rotated thereby, another selectively operable locking means for maintaining said third and fourth heads in adjusted positions along the length of said another shaft while the latter rotates, first, second, third and fourth tools mounted on the respective first, second, third and fourth heads and rotatable therewith, a first and second plurality of retainers mounting the respective first and second tools to the respective first and second heads for relative axial movement therebetween, first and second biasing means for the first and second heads urging the latter in a first axial direction toward the respective third and fourth tools, said retainers including portions limiting relative axial movement in said first direction between said first and second tools and the respective first and second heads.

4,026,177
ROTARY INSULATED SAW BLADE

Robert C. Lokey, Tamal, Calif., assignor to Lokey Tool, Inc., San Leandro, Calif.

Filed July 21, 1976, Ser. No. 707,358
Int. Cl.² B23B 61/02; B27B 33/08
U.S. Cl. 83—835 3 Claims

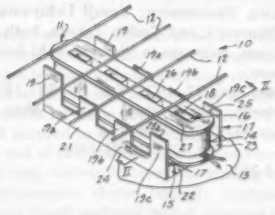


1. A saw blade comprising a generally circular inner metallic portion having an axial arbor bore extending therethrough, an outer metallic ring having saw teeth formed thereon spaced outwardly of the outer edge of said inner portion, and a plastic insulating ring rigidly connecting said inner portion and said outer ring.

4,026,178
MAGNETIC PICKUP FOR STRINGED MUSICAL INSTRUMENT

Walter Leonard Fuller, Kalamazoo, Mich., assignor to Norlin Music, Inc., Lincolnwood, Ill.

Filed Apr. 11, 1975, Ser. No. 567,290
Int. Cl.² G10H 3/00
U.S. Cl. 84—1.16 16 Claims

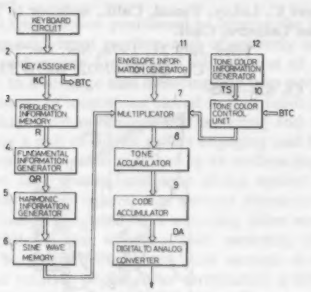


1. A magnetic pickup for a musical instrument having a plurality of strings, comprising:
   a. a coil common to said strings;
   b. an inner ferromagnetic polepiece common to said strings and partially disposed in said coil;
   c. magnet means common to said strings and magnetically coupled to said inner polepiece and inducing a single polarity in said inner polepiece; and
   d. at least one flat outer ferromagnetic polepiece magnetically coupled to the magnet means outside of said coil and having a polarity opposite to that of the nearest portion of said inner polepiece.

4,026,179
ELECTRONIC MUSICAL INSTRUMENT

Tsuyoshi Futamase, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Japan

Filed Sept. 22, 1975, Ser. No. 615,643
Claims priority, application Japan, Sept. 25, 1974, 49-110185
Int. Cl.² G10H *1/02*; G10F *1/00*
U.S. Cl. 84—1.24 **6 Claims**



1. An electronic musical instrument in which amplitude information for the fundamental and harmonic components of a musical tone waveshape is multiplied with tone color information for controlling the respective levels of said fundamental and harmonic components, wherein a tone color control unit is provided for modulating said tone color information before the multiplication of said amplitude information therewith takes place, said tone color control unit comprising:

memory means having information stored therein consisting of data defining different respective attenuation level vs. frequency characteristics of a plurality of filters;

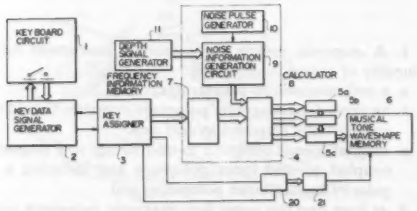
read out means for reading out from said memory means, characteristic-by-characteristic, the stored data information defining each filter characteristic; and

calculating means for calculating attenuation level information on the basis of the read out data information, said calculating means including an adder for adding said attenuation level information to said tone color information for the modulation thereof.

4,026,180
ELECTRONIC MUSICAL INSTRUMENT

Norio Tomisawa, Hamamatsu; Yasuji Uchiyama, Hamakita; Takatoshi Okumura, and Toshio Takeda, both of Hamamatsu, all of Japan, assignors to Nippon Gakki Seizo Kabushiki Kaisha, Japan

Filed May 27, 1975, Ser. No. 581,181
Claims priority, application Japan, May 31, 1974, 49-61715; May 31, 1974, 49-61716
Int. Cl.² G04H *1/04*
U.S. Cl. 84—1.25 **6 Claims**



1. An electronic musical instrument for producing a musical tone waveshape representing a musical tone having random vibrato, comprising means for producing a key address code corresponding to a depressed key;

a frequency information memory for storing frequency information corresponding to predetermined pitches of respective keys and producing, upon receipt of the key address code, frequency information corresponding to the key address code;

a noise pulse generator for producing a pulse at random ones of regularly occurring time intervals;

means for producing a vibrato depth signal which represents a frequency-modulation factor;

a noise information generation circuit for producing, in response to the output of said noise pulse generator, noise information for frequency-modulating said predetermined pitches of respective keys with a frequency modulation factor corresponding to said depth signal;

a calculating device for producing modified frequency information of a value obtained by frequency-modulating the frequency information by means of the noise information supplied from said noise information generation circuit;

a frequency counter for receiving and cumulatively adding the modified frequency information;

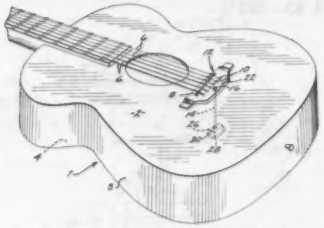
a musical tone waveshape memory for previously storing a desired musical tone waveshape and producing it is response to the output of said frequency counter; and

envelope control means for controlling the entire level of the musical tone represented by the waveshape produced by said memory.

4,026,181
TENSION ROD

Lester M. Barcus, 16226 Wayfarer Lane, Huntington Beach, Calif. 92649, and John F. Berry, 3392 St. Albans Drive, Los Alamitos, Calif. 90720

Filed July 7, 1975, Ser. No. 593,302
Int. Cl.² G10D *3/00*, *1/02*
U.S. Cl. 84—291 **14 Claims**



1. A stringed instrument comprising:

a. a resonant body having a top plate, a back plate, and a peripheral rib,

b. bridge means positioned on said top plate for contact with string members of said stringed instrument, and

c. means connected between said back plate and said bridge means for adjustably tensioning said top plate toward said back plate.

4,026,182
TUNING PEG

Donald A. Gilbrech, 1302 Beechwood Ave., Fayetteville, Ark. 72701

Filed Apr. 15, 1976, Ser. No. 677,422
Int. Cl.² G10D *3/14*
U.S. Cl. 84—305 **7 Claims**

1. A tuning peg comprising:

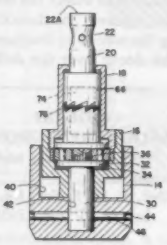
a cylindrical housing having an axial large diameter opening at one end and a coaxial smaller diameter opening at the

other, the juncture of the openings providing an internal shoulder;

a cylindrical shaft having adjacent the first end an integral enlarged diameter coaxial collar, the portion adjacent the second end of the shaft being rotatably received in said housing smaller diameter opening, the diameter of said collar being less than said larger diameter opening of said housing and said collar being rotatably received in said housing, one surface of the collar frictionally engaging said housing internal shoulder;

a cylindrical thrust member coaxially supported adjacent said shaft first end and having means at its first end for rotationally coupling to said shaft, the thrust member having at the second end at least a portion of the end surface inclined to the cylindrical axis;

a cylindrical capstan having a reduced diameter peg portion at the first end to receive and wind the string of a musical instrument thereabout, the portion at the second end



being of a diameter of said thrust member second end providing a shoulder between the outer portions, the capstan having at the second end at least a portion of the end surface inclined to the cylindrical axis, the capstan being supported coaxially with said thrust member and having the inclined surface thereof in engagement with said inclined surface of said thrust member; and

a capstan retainer having an inner opening rotatably receiving said capstan second end and a reduced diameter coaxial outer opening receiving said capstan peg portion, the capstan retainer having an inner shoulder frictionally engaging said capstan shoulder whereby as said capstan is rotated the inclined surfaces thereof react against the inclined surface of said thrust member which tends to force the capstan and thrust member away from each other causing increased frictional engagement of said shaft collar with said housing internal shoulder and said capstan shoulder with said capstan retainer inner shoulder.

4,026,183

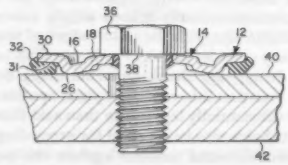
SEALING WASHER

Joseph James Bart, St. Charles, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed May 17, 1976, Ser. No. 686,767

Int. Cl.² F16B *35/00, 39/24*

U.S. Cl. 85—1 JP **4 Claims**



1. A composite sealing spring washer unit including a spring washer having an inner, dish-like spring section with a centrally located aperture spaced axially upwardly from a bearing surface, and axially displaceable downwardly under load, the bearing surface spaced radially inwardly of the outer perimeter of the washer member, the outer marginal surface section of the washer member forming a radially outwardly opening recess therebeneath between the bearing surface of the spring section and the outer perimeter of the washer member, the recess including an inner wall terminating at said bearing surface and extending upwardly therefrom and a generally planar upper wall extending radially outwardly from the inner wall, said inner wall providing a predetermined maximum height from the bearing surface to the upper wall of the recess, a resilient sealing ring positioned within the recess securely bonded thereto with the inner periphery of the sealing ring forming a generally cylindrical wall extending substantially perpendicular to the upper wall of the recess, said cylindrical inner wall periphery being substantially spaced radially outwardly from the inner wall of the recess and the bearing surface to prevent the sealing material from being compressed between the bearing surface and the workpiece, the sealing ring having a thickness which is greater than the predetermined height of the recess to permit a compressed seal to be formed beneath the washer and outwardly off the bearing surface.

4,026,184

BALL ANCHOR DOWEL

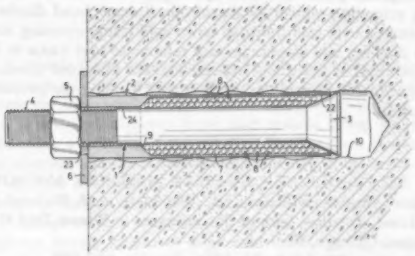
Dante Sozzi, Vaduz, Switzerland, assignor to Hilti Aktiengesellschaft, Schaan, Liechtenstein

Filed May 1, 1975, Ser. No. 573,422

Claims priority, application Germany, May 2, 1974, 2421258

Int. Cl.² F16B *13/04*

U.S. Cl. 85—63 **7 Claims**



1. An expansion dowel for use in a prepared borehole and the like, comprising an axially extending cylindrically shaped shank having a leading end and a trailing end with the leading end arranged to be inserted first into the borehole, said shank being threaded at its trailing end and having a frusto-conically shaped head secured to and extending axially outwardly from the forward end of said shank with the frusto-conically shaped surface widening outwardly from the leading end, an axially extending deformable sleeve laterally enclosing at least a portion of said shank and said sleeve adjacent said head having a maximum inside diameter which is not greater than the largest diameter of said frusto-conically shaped head, said sleeve having a leading end adjacent the leading end of said shank and a trailing end spaced axially from the leading end toward the trailing end of said shank, wherein the improvement comprises that said sleeve from its leading end for a portion of its axial length toward its trailing end is spaced radially outwardly from said shank forming an axially extending annular cavity therebetween, said sleeve having a radially inwardly projecting annular shaped collar extending axially from a plane between the leading end and trailing end of said sleeve toward the trailing end thereof and the radially inner surface of said collar closely fitting the outside diameter of

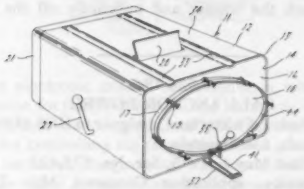
said shank so that said shank can be slidably displaced relative to said collar, the end of said collar closer to the leading end of said sleeve forming a radially inwardly directed annular shoulder forming a closure for the end of said cavity closer to the trailing end of said shank, said head extending into and forming a closure for the leading end of said sleeve so that said cavity is closed in the axial and radial directions, and a plurality of small balls formed of a hard material filled into said cavity so that said balls are disposed in contact with one another and with the inner surface of said sleeve and the surface of said shank within the axially extending range of said cavity and are capable of deforming said sleeve when said head is moved relative to said sleeve inwardly into the cavity within said sleeve.

4,026,185

DRUM

George Migirian, 2832 E. Grand Blvd., Detroit, Mich. 48211

Filed Oct. 21, 1975, Ser. No. 624,429
Int. Cl.² G10D *13/02*
U.S. Cl. 84—411 R 7 Claims



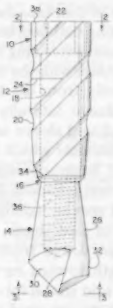
1. In a drum, a hollow casing of rectangular section having both ends open, a rectangular panel for closing one end of said casing, said panel having an opening, a frame about said opening extending outwardly therefrom, a drum head diaphragm stretched over said frame to cover said frame opening, means for drawing said diaphragm taut relative to said frame to form a percussion head, and spaced louvers mounted across the opposite end of said casing from that forming the percussion head.

4,026,186

SELF-DRILLING ONE-PIECE MASONRY ANCHOR

Elbert Eugene Williams, Jr., Wooddale, and Richard John Ernst, Palatine, both of Ill., assignors to Illinois Tool Works Inc., Chicago, Ill.

Filed Feb. 23, 1976, Ser. No. 660,595
Int. Cl.² E04B *1/48*
U.S. Cl. 85—68 6 Claims



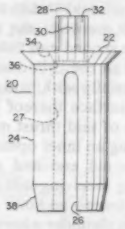
1. A one-piece bolt anchor device for drilling a blind, non-through bore in a masonry type support surface and anchoring therein without withdrawal of the device from the support surface, comprising an upper sleeve section having a predetermined outer diameter and a bore of predetermined inner diameter, the upper extremity of the sleeve section including surface means for inducing rotation of the device about its longitudinal axis, a lower drill section with a terminal extremity including laterally extending cutting edges at a diameter substantially equal to the predetermined outer diameter of the sleeve section, longitudinally extending material removing flutes intersecting each of the laterally extending cutting edges, a thin, frangible wall section interconnecting the drill section with the sleeve section, the portion of the drill section intermediate the cutting edges and frangible wall section being tapered inwardly providing an area into which the masonry material removed by the cutting edge may be received as well as means to expand the sleeve section when it is driven thereover, the upper sleeve including longitudinally extending grooves from the frangible wall section upwardly to facilitate the removal of masonry material from the bore, a threaded bore extending axially of the drill section, means in the bore for accepting axial forces to effect the drilling of the bore into the masonry surface, wherein the device may drill a bore and be set by impacting the sleeve to fracture the interconnecting wall and expand the sleeve over the drill section.

4,026,187

PLASTIC SCREW GROMMET

George E. Gross, Tinley Park, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Dec. 5, 1975, Ser. No. 638,219
Int. Cl.² F16B *13/08*
U.S. Cl. 85—72 13 Claims



1. A one-piece plastic nut in combination with an apertured workpiece, said aperture being circular and having a predetermined diameter and a screw having a predetermined diameter through a substantial portion of its predetermined length, said nut including a head portion, a shank portion extending from said head having a diameter greater than said predetermined diameter of said workpiece aperture and having at least one slot therethrough to permit radial deformation of the shank portion during insertion in said workpiece aperture, said slot in the shank portion extends throughout substantially the entire length of said shank portion, the head and shank portions including a through bore having a predetermined diameter extending between opposite ends of said nut, said bore and the exterior surface of said shank being smooth, a drive pin having a length substantially less than said nut and acceptable within said bore, said pin having crushable means carried thereon, said crushable means on said drive pin including a plurality of circumferentially spaced axially extending flutes forming crushable ribs with the outer edges of said ribs lying on an imaginary cylinder equal to or larger than said through bore in said head, said shank elements being deflected inwardly upon insertion into said workpiece aperture to form a tapered bore substantially less in size than said fluted pin, said pin and its crushable ribs being sized for expanding said shank portion a predetermined amount against the walls of said workpiece aperture into a pressfit condition having a force against said aperture wall which is capable of resisting rotation of said nut and exceeds the torque forces applied thereto when

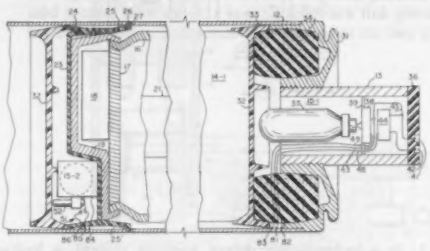
said screw is introduced into said through bore and forms its threads in the wall of said bore, said shank portion having a predetermined wall thickness which is substantially rigid relative to the predetermined circumferential thickness of said ribs thereby producing the controlled crushing of said ribs when the pin is driven into said bore.

4,026,188

MODULAR BUOY SYSTEM

Thomas E. Woodruff, Nashua, and Roger I. Saunders, Hollis, both of N.H., assignors to Sanders Associates, Inc., Nashua, N.H.

Filed Dec. 24, 1975, Ser. No. 644,791
Int. Cl.² F41F 5/02
U.S. Cl. 89—1.5 R 18 Claims



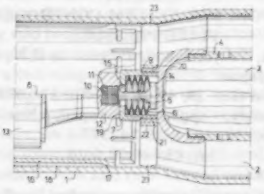
1. A sonobuoy system, comprising, a container including forward and aft ends, a plurality of sonobuoys in said container, a like plurality of launch mechanisms, one for each sonobuoy, each for ejecting its associated sonobuoy through said forward end of said container in response to an electric signal, terminals adjacent said aft end for receiving a plurality of substantially identical electric signals successively, and means, including an electric circuit positioned within said container and interconnecting said terminals and said launch mechanisms, for directing successive signals so received to said launch mechanisms sequentially in a predetermined order.

4,026,189

PROJECTILE LOCKING DEVICE

Rune Verner Akhagen, Eskilstuna; Claes Gustav Erik Yngve Tisell, Strangnas, and Anders Hakan Andersson, Eskilstuna, all of Sweden, assignors to Forenade Fabriksverken, Eskilstuna, Sweden

Filed Feb. 18, 1976, Ser. No. 659,158
Claims priority, application Sweden, Feb. 20, 1975, 7501893
Int. Cl.² F41F 3/02
U.S. Cl. 89—1.703 7 Claims



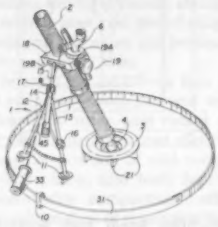
1. A projectile locking device for a recoilless weapon having a barrel for housing a projectile therein and a muzzle on the barrel comprising, in combination, a breakable connector for connecting the projectile to the weapon barrel, said breakable connector including a holding device, means for connecting said holding device to the weapon barrel, a breakable rigid member, a resilient member, means including said holding device for interconnecting said breakable rigid member and said resilient member in series to form an assembly, said assembly having one end connected to the rear end of the projectile and having the other end connected to said holding device to retain the projectile in a rest position within the weapon barrel, said breakable rigid member being formed of a material for permitting said rigid member to break only when the projectile is subjected to the force of the propelling gases in the weapon and has moved a predetermined distance from said rest position towards the weapon muzzle against the action of said resilient member.

4,026,190

MORTAR SIGHTING DEVICE

Oather Blair, 8415 Lou Court, Louisville, Ky. 40219

Filed Sept. 22, 1975, Ser. No. 615,289
Int. Cl.² F41G 1/34
U.S. Cl. 89—41 B 4 Claims



1. A missile firing weapon emplacement, including a missile firing weapon; ring means, separated from said weapon to be affected by the recoil of said missile firing weapon, and located a selected distance from said missile firing weapon surrounding a portion of the missile firing weapon emplacement wherein said weapon is located generally at the center of said separate ring means;

indicator means to indicate location of selected azimuth readings on said separate ring means; and

sighting device means to align said missile firing weapon with said indicator means on said separate ring means.

4,026,191

MACHINE TOOL

Robert E. Blomquist, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Nov. 17, 1975, Ser. No. 632,514
Int. Cl.² B23C 1/00
U.S. Cl. 90—11 D 13 Claims

1. A machine tool having a spindle with a taper to receive a matching taper on a flanged tool adapter, rotatable support means for engagement by the adapter flange to hold the adapter in a fixed position and provide support for the tool during machining, an axially movable spindle part having said spindle taper, means interengaging the tool adapter and spindle part to move the matching taper of the adapter into a complete fit with the spindle taper by axial movement of the spindle part toward the adapter while the adapter is held in said fixed position, and means for locking the spindle part against axial movement during machining.

4,026,192

MOTOR DRIVEN BY A PRESSURIZED FLUID MEDIUM FOR OPERATING AN IMPACTING TOOL IN A LINEAR DIRECTION

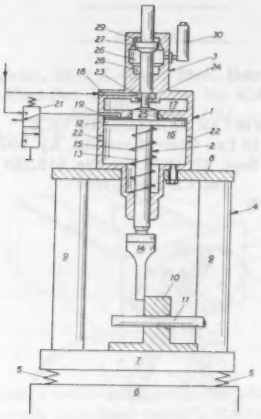
Carl Anders Noren, Saltsjo-Boo, and Bertil Waldemar Sundin, Enskede, both of Sweden, assignors to Atlas Copco Aktiebolag, Nacka, Sweden

Continuation of Ser. No. 301,522, Oct. 27, 1972, abandoned. This application May 17, 1974, Ser. No. 470,714

Claims priority, application Sweden, Nov. 12, 1971, 14497/71

Int. Cl.² F15B 15/22

U.S. Cl. 91—25 13 Claims



1. A reciprocating linear high acceleration impact tool driven by a pressure fluid to deliver high impact energy to an object during the impact strokes, comprising:

a. a housing defining a drive chamber, a pressure chamber for storing pressure fluid and a damping chamber containing a hydraulic fluid for absorbing surplus kinetic energy generated by the impact strokes;

b. an inlet port for admitting pressure fluid into said pressure chamber;

c. passage means for passing pressure fluid from said pressure chamber into said drive chamber

d. a piston unit comprising a piston rod mounted to reciprocate within said housing and extending through said chambers and having one end thereof extending externally of said chambers for carrying an impact tool;

e. said piston unit including:

i. a driven piston arranged to reciprocate within said drive chamber;

ii. a retard piston arranged to reciprocate within said damping chamber;

iii. a control piston for controlling the admission of pressure fluid from said pressure chamber to said drive chamber;

f. means effective to initiate an impact stroke upon said drive piston;

g. said control piston being effective to maintain communication between said pressure chamber and said drive chamber closed during the position of rest of said drive piston and during the initiating portion of the impact stroke and to open said communication after the piston has moved a predetermined distance to thereby impart an accelerating force to the piston;

h. said piston unit additionally including means for maintaining said inlet port open during the position of rest of the drive piston and closed during the impact stroke.

4,026,193

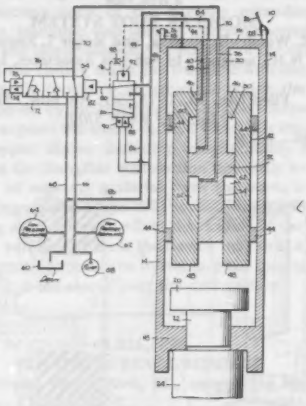
HYDRAULICALLY DRIVEN HAMMER SYSTEM

Peter B. Olmsted, Traverse City, Mich., assignor to Raymond International Inc., Houston, Tex.

Filed Sept. 19, 1974, Ser. No. 570,425

Int. Cl.² F01L 25/06; F01B 7/18, 15/00

U.S. Cl. 91—216 B 12 Claims



1. In a hydraulically driven hammer system, a hydraulic piston and cylinder assembly and means for actuating said assembly for causing reciprocal relative movement between the piston and cylinder thereof, a support frame connected to a stationary part of said piston and cylinder assembly, a massive ram connected to a moveable part of said piston and cylinder assembly, said massive ram being guided by said frame for reciprocal relative movement therein, means forming outer hydraulic and inner hydraulic elements with the inner element located inside the outer element, one of said elements being fixed with respect to said frame and the other element being fixed with respect to said ram, said outer element being formed with an inner hydraulic chamber exposed to said inner element and maintained continuously open to a first hydraulic pressure, one of said elements being formed with a land which slides along the other element and which separates said chamber from a region maintained continuously open to a second pressure, a pilot conduit formed in said other element and opening out to the surface thereof facing said land for successive exposure to said first and second pressures as said ram undergoes reciprocal movement and hydraulic switching means operative in response to exposure of said pilot conduit to said first pressure to drive said ram in a direction causing the pilot conduit to become exposed to said second pressure, and vice versa, whereby said ram undergoes reciprocal movement.

4,026,194

REMOTE CONTROL SYSTEM CONTROLLED BY A FLUID PRESSURE

Hiroshi Uchida, Tokyo, Japan, assignor to K.K. Uchida Sangyo, Tokyo, Japan

Filed Oct. 28, 1975, Ser. No. 626,079

Claims priority, application Japan, Nov. 1, 1974, 49-126327; Dec. 10, 1974, 49-142377

Int. Cl.² F15B 9/10

U.S. Cl. 91—384 4 Claims

1. A remote control system controlled by fluid pressure comprising:

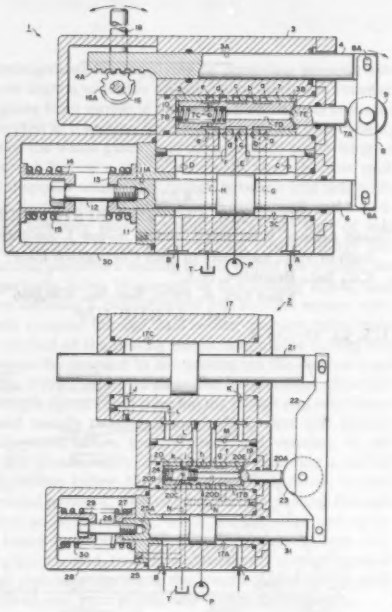
a master, said master comprising:

a control rod operated by an operator to move axially a first pilot spool disposed parallel to said first control rod, a first cylinder receiving slideably said first pilot spool therein and communicating with a hydraulic pilot

fluid source for supplying a pilot fluid, a first feedback link pivotably connected to said control rod at one end thereof and to said first pilot spool at the other end thereof and extending perpendicularly to the axis of said control rod and of the first pilot spool respectively, a first servo spool engaging with the middle portion of the first feedback link and controlling the supply of the pilot fluid into said first cylinder, a first means for urging said first pilot spool in a direction opposite to a direction of movement thereof, and a second means for urging said first servo spool toward the middle portion of said feedback link; and

a slave coupled to said master by only a pair of pilot fluid pipes, said slave comprising:

a second pilot spool moved axially in accordance with the pressure of the pilot fluid from said first cylinder, a rod having a rack formed thereon and disposed parallel to said second pilot spool, a second feedback link pivotably connected to said second pilot spool at the one end



thereof and to said rod at the other end thereof and extended perpendicular to the axis of said second pilot spool and of said rod respectively, a body having two chambers therein, communicating passages communicating said two chambers with an actuating fluid source for supplying and actuating fluid into said two chambers, a two wing rotor rotatably mounted in said body and being positioned one wing thereof in one of the chambers and the other wing thereof in another of the chambers, an actuating shaft connected bodily to said two win rotor, a pinion mounted on said actuating shaft and meshed with said rack formed on said rod a second servo spool engaging with middle portion of said second feedback link and controlling the supply of actuating fluid to said one of two chambers, a third means for urging said second pilot spool in a direction opposite to a direction of movement thereof, and a fourth means for urging said second servo spool toward the middle portion of said feedback link.

4,026,195

AXIAL PISTON MACHINE OF ADJUSTABLE STROKE

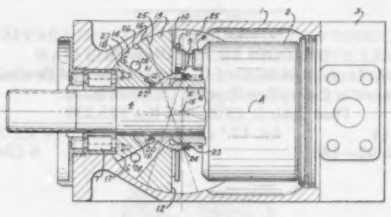
Franz Forster, Muhlbach, Germany, assignor to Linde Aktiengesellschaft, Hollriegelskreuth, Germany

Filed Oct. 23, 1975, Ser. No. 625,096

Claims priority, application Germany, Oct. 29, 1974, 2451380

Int. Cl.² F01B *13/04*

U.S. Cl. 91—506 **13 Claims**



1. An axial-piston machine comprising:

a housing surrounding a main axis and formed with a seat shaped at least partially as a surface of revolution centered on a transverse axis extending across said main axis;

a rotor in said housing rotatable therein about said main axis and provided with at least one piston reciprocal parallel to said main axis and having an end protruding from said rotor parallel to said main axis;

a rocker in said housing having a front face turned toward said rotor and engageable with said end and a back face turned away from said rotor, said rocker resting in said seat and being tiltable therein about said transverse axis, whereby the angular position of said rocker determines the stroke of said piston, said back face and said seat forming a pressurizable compartment offset from said transverse axis, said surface of revolution being a cylinder and said transverse axis being perpendiclar to said main axis, said back face and said seat forming a pair of such compartments to either side of said main and transverse axes, whereby tipping of said rocker about said transverse axis increases the volume of one of said compartments and decreases the volume of the other; and

means for introducing fluid selectively into said compartments and for applying fluid pressure directly to said back face and thereby tip said rocker about said transverse axis.

4,026,196

DEVICE FOR DRIVING A PUMP PISTON

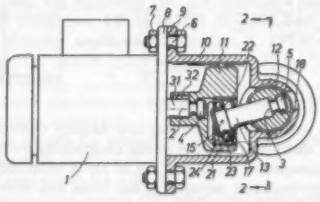
Hans Kristoffer Olofsson, Huddinge, Sweden, assignor to Atlas Copco Aktiebolag, Nacka, Sweden

Filed Nov. 6, 1975, Ser. No. 629,379

Claims priority, application Sweden, Nov. 22, 1974, 7414679

Int. Cl.² F01B *9/00;* **F04B** *7/16;* **F16H** *37/16*

U.S. Cl. 92—140 **4 Claims**



1. A pump assembly comprising a driving motor (1) which is provided with a rotatable drive shaft (31), and a piston (12) which is guided in a cylinder bore (14) for reciprocation along

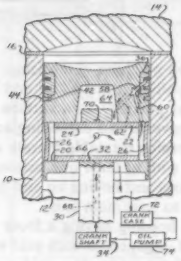
a linear path of movement (3) therein, said assembly comprising a single-row spherical ball bearing whose outer race (21) is eccentrically arranged in relation to said drive shaft (31) in a first element (11) which is rigidly connected with said drive shaft and whose inner race (22) is arranged on a second element (13) which is rigidly connected with said piston (12), so that rotation of the drive shaft causes the piston (12) to reciprocate in the cylinder bore (14) in a linear path synchronously with an oscillating turning motion about said linear path of movement (3).

4,026,197

OIL COOLED PISTON RINGS

Robert A. Lapke, and Bernard G. Richards, both of Peoria, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed June 2, 1975, Ser. No. 583,239
Int. Cl.² F01P *3/10*
U.S. Cl. 92—186 **6 Claims**



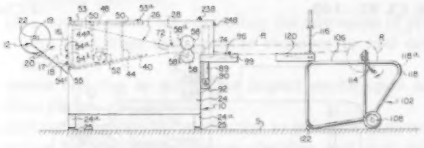
1. In a reciprocating engine, the combination comprising:
a cylinder;
a piston mounted for reciprocation in said cylinder;
a piston ring carried by said piston and in sealing engagement with said cylinder, said piston ring being hollow to define an elongated peripheral fluid flow path therethrough and having an inlet and an outlet peripherally spaced along said flow path;
means for directing a coolant through said inlet into said flow path to cool said ring during engine operation; and
a reinforcing matrix within said piston ring for precluding collapse of the hollow of said ring under high pressure.

4,026,198

CUSHIONING DUNNAGE MECHANISM, TRANSFER CART THEREFOR, AND METHOD

Gary W. Ottaviano, Bedford, Ohio, assignor to Ranpak Corporation, Eastlake, Ohio

Filed May 1, 1975, Ser. No. 573,615
Int. Cl.² B31F *1/10*
U.S. Cl. 93—1 WZ **18 Claims**



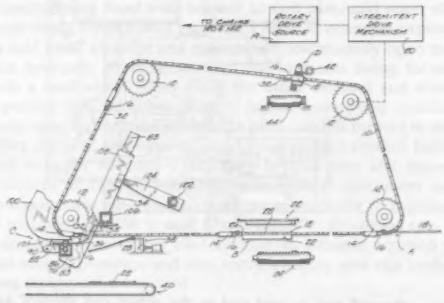
10. In a method of producing low density cushioning dunnage from sheet-like stock material comprising pulling from a rotatable composite multi-ply roll of stock material the webs of sheet-like material, separating the webs and then generally reimposing the webs together while rolling the lateral edges of the webs inwardly utilizing a lengthwise extending convergent chute having an entranceway, crumpling the rolled edge webs of material inwardly into a pad-like configuration of relatively low density per unit volume so that the rolled edges of the sheet-like material are disposed in generally confronting abutting condition, then connecting the rolled and crumpled edge portions together along the juncture thereof to form a unitary pad-like dunnage product, and wherein the pulling of the webs from the periphery of the rotatable roll and the separating of the webs into individual webs and the reimposing of the webs together while rolling the lateral edges of the webs inwardly is accomplished in a zone defined in general between substantially parallel longitudinal planes passing through respectively the axis of rotation of the roll and a predetermined surface of said chute at said entranceway, and wherein the material from said roll is withdrawn therefrom in the general lengthwise direction of extension of said chute, and wherein said connecting the rolled and crumpled edge portions together is accomplished by pressure applying means in conjunction with adhesive means for maintaining the unitary pad-like dunnage product and wherein the pressure applying means acts generally centrally of the product in a direction lengthwise thereof.

4,026,199

SHEET END CUTTER AND STRIPPER

David Adams, West Bend, and Ralmond J. Smiltneck, Butler, both of Wis., assignors to S&S Corrugated Paper Machinery Co., Inc., Brooklyn, N.Y.

Filed Oct. 6, 1975, Ser. No. 620,006
Int. Cl.² B31B *1/20*
U.S. Cl. 93—36 A **16 Claims**

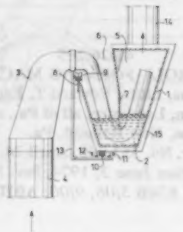


1. In a machine for processing sheet material and including at least one gripper for gripping a partially severed waste edge strip of a piece sheet material, and means for moving said gripper along a predetermined path to draw the gripped sheet therealong for processing, the improvement comprising a stripping tool mounted at a first work station adjacent to said predetermined path and positioned to strip the body of said sheet material from the waste edge thereof, means for actuating said stripping tool to completely sever said body from said strip, and means at a second work station adjacent to said path for opening said gripper to release said waste edge strip, a stripper element mounted adjacent to said path at said second work station, said stripper element being movable into contact with said waste edge strip to dislodge the waste edge strip from the gripper when the latter is opened, and means for moving said stripper element into contact with said waste edge strip when said gripper is opened.

4,026,200
ARRANGEMENT FOR SUPPLYING OR REMOVING GASEOUS SUBSTANCES TO OR FROM A MOVABLE OBJECT

Bo Lars Einar Lindqvist, Lyktvagen 3, 132 00 Saltsjobaden, Sweden

Filed Jan. 21, 1976, Ser. No. 651,175
Claims priority, application Sweden, Jan. 28, 1975, 7500879
Int. Cl.² F23J *11/00*
U.S. Cl. 98—115 VM **6 Claims**

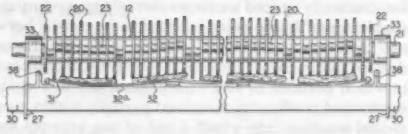


1. An arrangement for supplying or removing gaseous substances to or from a movable object, particularly for evacuating waste gases from movable objects in a room, and intended to be connected to a suction hose moved with the object being the source of the waste gases, said arrangement comprising an elongate trough having a pair of side walls and a bottom wall, a partition disposed within said trough between said side walls and spaced therefrom and from said bottom wall and a connecting wall between said partition and a side wall of said trough, said partition dividing said trough longitudinally into first and second portions a sealing liquid within the trough, the partition partially being immersed in the sealing liquid, said first portion defining a closed cavity and suction means communicatively coupled thereto, said second portion being open above the surface of the sealing liquid, and a pipe having one end adapted to be coupled to the source via the suction hose and movable within said trough in the longitudinal direction along the length thereof said pipe having a bent end introducable into said trough passing through both first and second portions, disposed below the partition and opening to the interior of the closed cavity, said bent end including a curved portion disposable below the sealing liquid surfaces in said first and second portions, said curved portion passing through both first and second portions, below the partition and opening to the interior of the closed cavity, carriage means coupling said pipe to said trough and means for moving said carriage and pipe together along the length of said trough with the bent end of said pipe positioned within said trough

4,026,201
CHARMARKER

Fred Fetzer, Strongsville, Ohio, assignor to Sam Stein Associates, Inc., Sandusky, Ohio

Filed June 10, 1976, Ser. No. 694,765
Int. Cl.² A47J *37/00*
U.S. Cl. 99—355 **7 Claims**

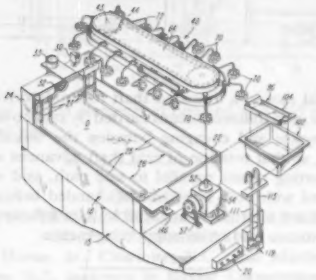


1. A char marker for marking meat patties comprising a cylindrical mandrel, means for supporting opposite ends of said mandrel above and parallel to a meat patty conveyor, a plurality of uniform marker rings, each ring having a concentric through opening greater in diameter than said mandrel, said rings mounted with said mandrel passing through said openings, means supporting said rings in parallel evenly spaced relationship on said mandrel, said through openings being of uniform diameter and of a size to permit each ring in a lower position relative to said mandrel to rest upon and roll over a meat patty, and means for heating each of said rings when in said position on said mandrel.

4,026,202
APPARATUS FOR AUTOMATICALLY PRODUCING WAFFLES AND SIMILAR FOOD ARTICLES

Roman Szpur, 2685 Culver Ave., Dayton, Ohio 45429

Filed Nov. 24, 1975, Ser. No. 634,363
Int. Cl.² A47J *37/12*
U.S. Cl. 99—355 **13 Claims**



1. In apparatus for automatically producing waffles or other food articles, and including means defining a cooking chamber for receiving a volume of cooking oil, means for heating the oil within said chamber, container means for receiving a supply of batter, means for maintaining the batter at a predetermined level within said container means, a plurality of article forming molds, power driven means for moving said molds along a path where said molds are successively immersed into the batter and then into the cooking oil and then delivered to a discharge station, and means at said discharge station for removing each cooked article from its corresponding mold, the improvement wherein said means for moving the molds along said path comprise an elongated endless conveyor, a plurality of arms connected to said conveyor at spaced intervals and supporting corresponding said molds for rotation relative to said conveyor, lever means connected to each of said arms for rotation therewith, and means positioned to engage said lever means on each said arm to effect rotation of said arm and mold for removing each cooked article from the cooking oil.

4,026,203
MACHINE FOR PEELING TOMATOES UNDER VACUUM

Renzo Levati, Via Nazionale No. 2, Collecchio (Parma), Italy

Filed Nov. 11, 1974, Ser. No. 522,644
Claims priority, application Italy, Oct. 9, 1974, 46866/74
Int. Cl.² A23B *1/00*; A23N *7/00*; A47J *17/00*
U.S. Cl. 99—472 **7 Claims**

1. Improved machine for peeling tomatoes under vacuum, which machine comprises

conveyor means for advancing a plurality of trays along a substantially horizontal path,

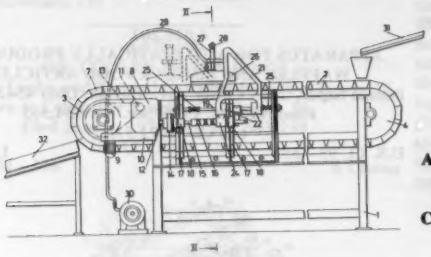
at least one cover for said trays,

cover-supporting means for advancing said covers above said trays parallel to said path, said cover-supporting means comprising a frame bridging said conveyor and mounted to reciprocate with respect to said path, and

means for urging said cover into and out of sealing engagement with said trays,

means for connecting said cover, while in sealing engagement with said trays, first to a vacuum chamber and then to a region under substantially atmospheric pressure, and

means for causing said conveyor and said coversupporting means to advance in synchronism which comprises a motor, a gear train through which said conveyor is driven



by said motor, a threaded shaft rotatably driven by said motor, and follower means carried by said cover supporting means and engaging between the threads on said shaft, so that rotation of said shaft advances said cover-supporting means parallel to said path, said shaft being formed with both right and left-handed helical grooves, which are alternately engaged by said follower means to reciprocate said cover-supporting means.

4,026,204

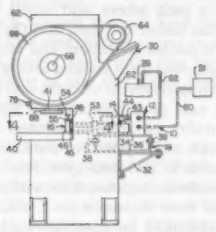
PRESS BLOCKING AND AIR LOGIC CONTROL SYSTEM

Maurice James Good, Oscoda, Mich., assignor to Starboard Industries, Inc., Birmingham, Mich.

Filed Mar. 22, 1976, Ser. No. 669,392

Int. Cl.[2] B30B *15/00*

U.S. Cl. 100—53 **20 Claims**



1. In a press ram blocking and control system for a press having

a frame supporting a movable ram-affixed upper tool holding bolster plate and a lower die plate fixedly supported on said frame,

means for reciprocatingly moving said ram-affixed upper bolster plate relative to said lower die plate, and press control circuitry to actuate and control said means to reciprocatingly move a frame supported ram,

the improvement comprising in combination

a fluid valve, a fluid cylinder communicating with said valve and having a reciprocatingly movable piston and piston rod actuated by operation of said valve,

means securing said cylinder and valve to said press frame,

a reciprocatingly movable blocking member for said upper bolster plate affixed to the distal end portion of said piston rod projecting from said fluid cylinder,

fluid valve control means communicating with said valve and mounted on said press frame in association with and for actuation by said means for moving said upper bolster plate,

and fluidic circuitry including said fluid valve, said fluid cylinder and said fluid valve control means responsive to a malfunction in normal press operation, whereby said blocking member is insertable between said movable upper bolster plate and said lower die plate in response to valve actuation of said fluid cylinder piston and piston rod upon the occurrence of malfunction in normal press operation.

4,026,205

HAY ROLL FORMING MACHINE

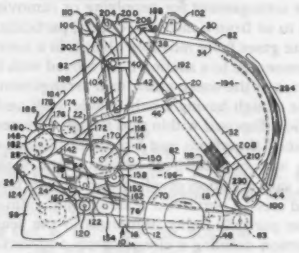
Allison W. Blanshine, Lititz; Edward T. Eggers, New Holland, and Myles Hyman, Lancaster, all of Pa., assignors to Sperry Rand Corporation, New Holland, Pa.

Continuation of Ser. No. 353,945, April 24, 1973, abandoned.

This application June 3, 1974, Ser. No. 476,022

Int. Cl.[2] B30B *5/06, 9/00;* **A01D** *39/00*

U.S. Cl. 100—88 **6 Claims**



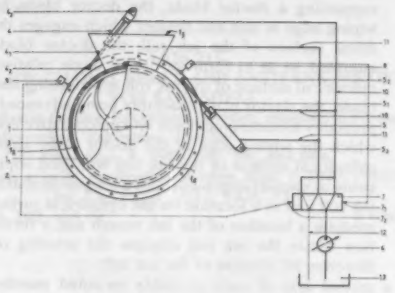
1. In a mobile hay roll-forming machine having a base frame provided with wheels for mobility and adapted to be propelled over a swath of hay in a field, bottom means in said frame, an endless lower apron supported for movement of the upper courses thereof longitudinally rearward relative to said bottom means and arranged to receive said swath of hay at the forward end thereof, drive means for said bottom apron operable to drive the same in a direction for the upper course to move rearwardly relatively to the direction of movement of said machine, an endless flexible upper apron, supporting means on said base frame for said upper apron arranged to position the lower course thereof above the upper course of said lower apron, and means to drive said upper apron to move said lower course thereof in the opposite direction to said upper course of said lower apron to form a coil of hay therebetween, the improvement which comprises:

an improved supplemental frame included in said supporting means for said upper apron, said supplemental frame being supported for rotary movement about a transverse horizontal axis and comprising pairs of members spaced radially in opposite directions from said rotary axis at opposite sides of said machine and respectively engaging outer and inner surface means of said upper apron at two longitudinally spaced locations therealong, said rotatable supplemental frame being adapted to be moved between two different positions relative to said base frame to dispose said members therein respectively in one position in which portions of said upper apron are in a compact contracted configuration at least partially within a cavity in said machine into which a roll of hay expands during formation and in another position in which said upper apron is expanded from said one position and the lower course thereof being expanded and in compressive engagement with the upper portion of a roll of hay within said machine.

4,026,206
PRESSING DEVICE WORKING IN CONTINUOUS OPERATION

Yves Cabrol, Aix en Provence, France, assignor to Societe d'Exploitation des ets Coq, Aix en Provence, France

Filed May 22, 1975, Ser. No. 577,869
Claims priority, application France, May 22, 1974, 74.17898
Int. Cl.² B30B 9/12
U.S. Cl. 100—117 3 Claims



1. A pressing device working continuously, comprising a motor setting a worm-screw into rotation inside a perforated cylinder, said cylinder being provided, at the vicinity of one of its ends, with an aperture for introducing the fruits to be pressed therein, and at its other end with a pressure door against which the fruits apply to extract the juice therof, a pressing-device wherein the motor element consists of at least a double-effect jack including a rod, fed with fluid under pressure, whilst the worm-screw is, inside the cylinder, integral with a disc provided with fingers or notches equally distributed along the peripheral thereof, the rod of the jack co-operating in succession with the fingers or notches so as to set them into motion.

4,026,207
PRE-LOADED RAM-TOOL HOLDER ENERGY ABSORBING MECHANISM

Walter J. Gailus; Robert Lam, both of Chicago, and Jayadev P. Patel, Bolingbrook, all of Ill., assignors to The Continental Group, Inc., New York, N.Y.

Filed Jan. 9, 1976, Ser. No. 647,692
Int. Cl.² B30B 1/26
U.S. Cl. 100—214 5 Claims

1. A press comprising a base and a head carried from the base,

a reciprocal ram assembly supported from the head,

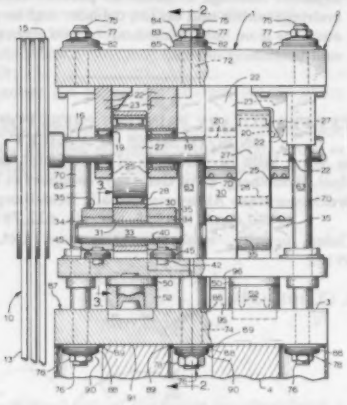
tool mounting means for supporting tools between the ram and base,

load transfer means operatively connecting said ram assembly with the head,

said load transfer means comprising pre-loaded resilient means interposed between the ram and said tool mounting means for absorbing loads transcending predetermined operating loads,

said pre-loaded means comprising inter-related elements slidably movable along an axis extending transversely of the tool mounting means, and pre-loaded spring means interposed between said elements coaxially with said axis,

and said tool mounting means comprising a ram platen, means slidably guiding said ram platen for movement between said base and said head, and one of said elements comprising a pilot pin secured to said platen and a plurality of Belleville springs sleeved over said pin and abutting

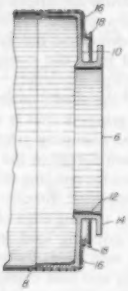


the other of said elements at one end and said platen at the other end.

4,026,208
ROTARY PRINTING SCREEN HAVING HEAT-SHRUNK SUPPORT MEMBERS

Charles G. Horne, Jr., Charlotte, N.C., and Martin Sobel, Flemington, N.J., assignors to Raylar Corporation, Charlotte, N.C.

Continuation-in-part of Ser. No. 417,979, Nov. 21, 1973, abandoned. This application May 13, 1975, Ser. No. 577,000
Int. Cl.² B05C 17/06
U.S. Cl. 101—116 14 Claims



1. A rotary printing screen for mounting in a rotary screen printing machine having a tensioning device for longitudinally tensioning said rotary printing screen, comprising:

A. a pair of mutually parallel, coaxially disposed, and axially spaced endrings, each having a central rotational axis, an outer cylindrical surface, and an adjacent radially disposed shoulder extending toward said axis;

B. a screen cylinder which is coaxially aligned with said axis, having a central portion and a terminal portion at each end thereof, each said terminal portion being positioned over one of said outer cylindrical surfaces; and

C. a pair of selectively heat-shrunk plastic support members, each of which is attached to one of said terminal portions and extends over said adjacent shoulder toward said axis as a radially recessed lip which increases progressively in thickness with distance from said cylindrical surface and terminates in a thickened bead, said support members uniformly resisting axially directed pressure

from said longitudinal tensioning of said rotary printing screen and serving as a positive means to support the adjacent endrings in order to prevent cocking of said endrings within said screen cylinder and to prevent said endrings from being pulled out of said screen cylinder by said tensioning device.

4,026,209

SHEET-FED ROTARY PRINTING PRESS FOR PRINTING ON BOTH SIDES OF A SHEET

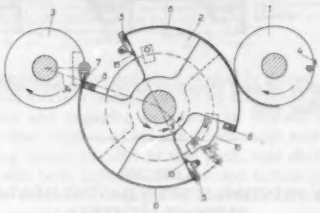
Arno Wirz; Willi Becker, both of Bammental, and Bernhard Maul, Heidelberg, all of Germany, assignors to Heidelberger Druckmaschinen Aktiengesellschaft, Heidelberg, Germany

Filed Oct. 15, 1975, Ser. No. 622,701

Claims priority, application Germany, Oct. 16, 1974, 2449122

Int. Cl.² B41F *21/04*

U.S. Cl. 101—231 **2 Claims**



1. In a sheet-fed rotary printing press for printing on both sides of a sheet, an assembly of a transfer drum, a storage drum and a sheet turn-over drum mounted in succession and located between two printing units, clamping grippers on said storage drum for gripping the leading edge of a sheet being fed from the transfer drum to the storage drum, means for exerting a clamping force by said clamping grippers, tong grippers on said turn-over drum for gripping the trailing edge of the sheet at an imaginary straight line connecting the rotary centers of the storage drum and the turn-over drum as the sheet is being transferred from the storage drum to the turn-over drum and as the clamping grippers of the storage drum release the leading edge of the sheet, means for exerting a clamping force by said tong grippers that is weaker than the clamping force exerted by the clamping grippers yet strong enough to overcome the tension forces in the sheet tending to produce waves therein, means for rotating said turn-over drum and said storage drum in opposite directions and moving said tong grippers gripping the trailing edge of said sheet away from said clamping grippers gripping said leading edge of said sheet thereby tensioning said sheet between said tong grippers on said turn-over drum and said clamping grippers on said storage drum so as to smooth out any waves produced in the sheet, to and permitting said sheet to undergo a predetermined amount of sliding movement relative to said tong grippers while gripped thereby.

4,026,210

PRINTING APPARATUS AND METHOD

Frank Merzagora, Montreal, Canada, assignor to Rotobind Ltd., Montreal, Canada

Continuation-in-part of Ser. No. 571,622, April 24, 1975, abandoned. This application July 7, 1975, Ser. No. 593,562

Int. Cl.² B41F *31/36*, *31/30*

U.S. Cl. 101—350 **11 Claims**

1. An improved flexographic printer including:

a frame;

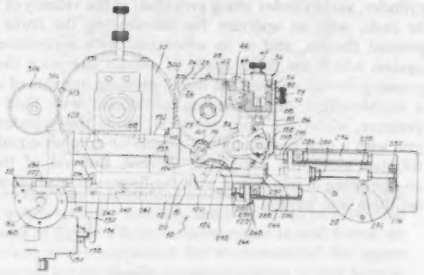
an ink roll, the ink roll being rigidly mounted on a shaft, the shaft and ink roll being rotatably mounted on said frame;

a printing roll rigidly mounted on a printing roll shaft, the printing roll shaft being rotatably mounted in a supporting frame structure, the supporting frame structure being rigidly mounted on the frame with said printing roll contacting said ink roll;

an ink trough supported by said frame, the ink trough containing a quantity of ink, the ink being applied to a cylindrical surface of the ink roll as the ink roll rotates past the ink trough;

a pair of pivotably mounted members supported by said frame, each member having a first arm, the pair of first arms supporting opposite ends of a reverse angle doctor blade assembly, said reverse angle doctor blade assembly supporting a doctor blade, the doctor blade having a wiping edge at one end thereof which engages the cylindrical surface of the ink roll, the doctor blade being mounted so as to form an obtuse angle relative to the cylindrical surface of the ink roll approaching the doctor blade, the doctor blade assembly being advanced by said pivotably mounted members into an operative position in which the wiping edge of the doctor blade engages the cylindrical surface of the ink roll with said wiping edge being in parallel alignment with a longitudinal axis of said ink roll and at a location on the cylindrical surface intermediate a location of the ink trough and a further location where the ink roll engages the printing roll, in a direction of rotation of the ink roll;

a second arm of each pivotably mounted member being engaged by actuator means continuously applying a force to each pivotally mounted member pivoting each pivotably mounted member about a respective pivot point with the wiping edge of the doctor blade being continuously biased into line contact with the cylindrical surface of the ink roll at equal force along the length of said doctor blade;



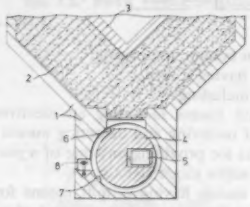
a shaft portion mounted on each end of the doctor blade assembly, a mounting bracket mounted on each shaft portion by means of a self-aligning bearing situated in each mounting bracket, each mounting bracket engaging cooperating means mounted on the first arm of each pivotably mounted member, the cooperating means releasably retaining the mounting brackets in contact with the first arms of the pivotably mounted members, at least one end of said doctor blade assembly includes adjusting means, said adjusting means comprising a member rigidly secured to the shaft portion of the assembly, said member supporting an adjustment screw having a ball-like end in engagement with a cooperating slot located in a follower member, the follower member being slidably movable along a curved path situated on a holder, the holder being secured to a side of the doctor blade assembly mounting bracket and the curved path being of constant radius with respect to a center of its respective shaft portion, a position of the follower member on the curved path being manually adjustable by clamp means in order to releasably retain said follower member at a desired location on said curved path, said manual adjustment of said follower member permitting the member secured to the shaft portion and its engaging means to be set in a desired

angular position relative to said respective mounting bracket, whereby an angle of said doctor blade with respect to a tangent to the cylindrical surface of said ink roll is obtainable, the ball-like end of the adjusting screw permitting the mounting bracket to pivot on the shaft portion about said ball-like end in any position of engagement of the ball-like end with the cooperating slot in the follower member, whereby tilting of said mounting bracket relative said shaft portion and member rigidly mounted thereon is obtained and self-aligning movement of said doctor blade assembly relative to said ink roll is achieved.

4,026,211
HOLLOW-CHARGE SHELL AND ANTITANK WEAPON FOR SAID SHELL

Hans Martin Ostling, Eskilstuna, Sweden, assignor to Forenade Fabriksverken, Eskilstuna, Sweden

Filed Mar. 5, 1976, Ser. No. 664,066
Claims priority, application Sweden, Mar. 7, 1975, 7502568
Int. Cl.² F42B *13/10*; F42C *15/34*
U.S. Cl. 102—24 HC **5 Claims**



1. A hollow-charge shell of the type having a hollow explosive charge and anti-tank weapon for the shell comprising, in combination, an adjustable safety device provided with a blasting cap, said safety device being mounted on the shell for adjusting movement between a safety position and into either of two armed positions with said blasting cap in an ignition line for initiation of the hollow-explosive charge upon the discharge of the shell, blocking means mounted on the shell for selectively limiting the adjusting movement of said safety device to said two armed positions, said blocking means being arranged to selectively limit the movement of said safety device to one of said armed positions wherein the longitudinal axis of said blasting cap coincides with the central axis of the shell to bring about a symmetrical initiation of the explosive charge or to the other of said armed positions wherein the longitudinal axis of said blasting cap forms an angle with the central axis of the shell to bring about an unsymmetrical initiation of the explosive charge.

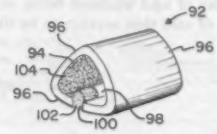
4,026,212
OPEN CHAMBER GAS POWERED TOOL AND GAS GENERATING CHARGE THEREFOR

David Dardick, 500 Via del Monte, Palos Verdes Estates, Calif. 90274

Continuation of Ser. No. 359,754, May 14, 1973, abandoned. This application Apr. 23, 1975, Ser. No. 570,909
Int. Cl.² F42B *3/04*
U.S. Cl. 102—39 **2 Claims**

1. An open chamber gas generating charge for an open chamber gas powered tool, comprising:
a plasticly deformable jacket of generally uniform triangular cross-section from end to end having sidewalls which are cylindrically curved about the longitudinal axis of the jacket and containing a propellant chamber of uniform cross-section from end to end extending longitudinally through and opening through the ends of said jacket,
said jacket having flat end faces in planes normal to said axis and surrounding the open ends of said chamber;
nitrocellulose filling said chamber; and sheet-thin flammable paper end seals bonded to said jacket end faces and closing the open ends of said chamber,
said jacket has a recess entering one end face of the jacket and opening to said propellant chamber; and
a priming compound filling said recess.

2. In combination:
a feed belt;
open chamber gas generating charges spaced along said belt;
each charge comprising a plasticly deformable jacket of generally uniform triangular cross-section from end to end having sidewalls which are cylindrically curved about

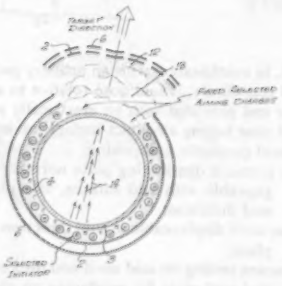


the longitudinal axis of the jacket and containing a propellant chamber of uniform cross-section from end to end extending longitudinally through and opening through the ends of said jacket, said jacket having flat end faces in planes normal to said axis and surrounding the open ends of said chamber, nitrocellulose filling said chamber, and sheet-thin flammable paper end seals bonded to said jacket end faces and closing the open ends of said chamber; and means bonding one sidewall of each charge to the belt,
said seals comprise flaps along the longitudinal edges of said belt which are folded against and secured to the ends of said jackets.

4,026,213
SELECTIVELY AIMABLE WARHEAD

Marvin L. Kempton, Socorro, N. Mex., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed June 17, 1971, Ser. No. 154,203
Int. Cl.² F42B *13/18*
U.S. Cl. 102—56 SC **7 Claims**



1. A selectively-aimable warhead comprising:
a generally cylindrical warhead skin member,
a generally cylindrical warhead casing member spaced radially inwardly of said skin member,
a main explosive charge disposed in the space between said members,
detonating means disposed inwardly of said skin member for disabling a selected arcuate section of the warhead skin, said means exerting a detonating force acting in a radially outward direction said selected skin section with a force magnitude below that required for detonating said

main charge and above that required for disabling said selected section, and

firing means for initiating a detonation of said explosive charge,

said firing means being disposed to initiate said detonation in an area of the main explosive charge located approximately diametrically opposite said disabled arcuate section, and

said main charge detonation having an inwardly-directed force sufficient to fragment a section of said casing member disposed in its initial propagation path whereby said fragments are explosively driven through said disabled section,

the aimability of said warhead being achieved through the selection of said skin section to be disabled.

4,026,214

IMPACT FUZE FOR ARTILLERY SHELL

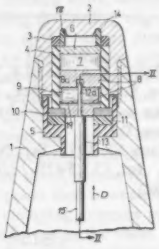
Günter Backstein, Meerbusch, Germany, assignor to Rheinmetall G.m.b.H., Dusseldorf, Germany

Filed Dec. 5, 1975, Ser. No. 638,077

Claims priority, application Germany, Dec. 7, 1974, 2457946

Int. Cl.² F42C *11/02*

U.S. Cl. 102—70.2 GA **6 Claims**



1. In combination with an artillery projectile having a nose and rearwardly of said nose relative to a direction of travel a rear end provided with an electrically activatable detonator, said nose having a contact surface, an impact fuze at the nose of said projectile comprising:

a pressure distributing plate normally spaced from but engageable with said surface, said plate being movable in said direction;

an anvil displaceable in said direction and spaced from said plate;

means resting on said anvil and disposed between said anvil and said plate for producing an electrical current when compressed between said anvil and said plate, said means being movable in said direction;

a pin seated in said anvil and extending transversely to said direction; and

a spring-steel wire resiliently retaining said anvil against movement toward said surface, said wire having a front end looped around said pin and a rear end connected to said detonator, said wire being longitudinally extensible in said direction upon impact of said projectile whereby said anvil, said means and said plate are displaced toward said surface, said current passing through said wire from said anvil to said detonator.

4,026,215

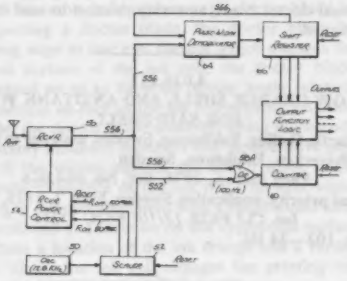
CONTROLLED RANGE, MULTI-MODE FUZE

Richard T. Ziemba, Burlington, Vt., and Myron D. Egtvedt, Skaneateles, N.Y., assignors to General Electric Company, Burlington, Vt.

Filed May 14, 1975, Ser. No. 577,496

Int. Cl.² F42C *11/06*

U.S. Cl. 102—70.2 R **20 Claims**



1. A weapon system comprising:

a projectile having a fuze,

said fuze including

data link means including an electromagnetic wave signal receiving and detecting means and an output means for providing any one of a plurality of different output mode signals;

timing means having output means for providing an output timing signal at the end of a first predetermined period of time of flight of said projectile, and coupled to said data link means to normally disable said data link means, and upon provision of said output timing signal, to enable, for a second predetermined period of time, said data link means to receive and detect electromagnetic wave signals.

4,026,216

ARMING FUZE FOR ARTILLERY SHELL

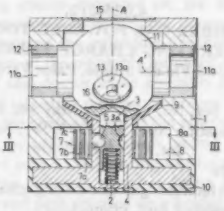
Günter Backstein, Meerbusch, Germany, assignor to Rheinmetall G.m.b.H., Dusseldorf, Germany

Filed Dec. 5, 1975, Ser. No. 638,076

Claims priority, application Germany, Dec. 7, 1974, 2457947

Int. Cl.² F42C *15/22*

U.S. Cl. 102—79 **7 Claims**



1. A fuze for an artillery shell to be spun about an axis generally parallel to the direction it is fired, said fuze comprising:

a housing formed with a central axially extending sleeve, an inner surface facing said sleeve, and a chamber between said sleeve and said inner surface;

a pin axially slidable in said sleeve;

at least one ball radially displaceable in said sleeve and radially engageable against said pin to arrest same; and

spiral spring means in said chamber around said sleeve and including

an inner spring element lying against said sleeve and normally pressing said ball against said pin, said inner element being of very hard material not deformable by said ball,

an outer spring element engageable with said inner surface and having a surface with a high coefficient of friction, and

an intermediate spring element between said inner and outer section and having substantially more turns than both said inner and outer elements.

4,026,217

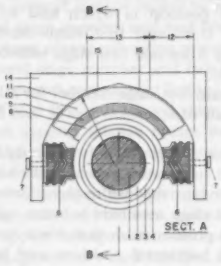
SELF STEERING RAILWAY AXLES AND WHEELS ON TRACK CURVATURES

Homer C. Cross, Wantach, N.Y., and Daniel L. Jerman, Ramsey, N.J., assignors to Parsons, Brinckerhoff, Quade & Douglas, Inc., New York, N.Y.

Filed Aug. 7, 1975, Ser. No. 602,751

Int. Cl.² B61F *15/00, 5/30*

U.S. Cl. 105—224.1 **6 Claims**



1. A self steering construction for axles and wheels of railway trucks, comprising an adapter journal box, a bearing complex adapted to receive the truck axle and including an outer race for bearings, opposed spring elements engaging the sides of the said race and the side inner faces of the journal box, the journal box having an upper wall with a smooth metallic under face, a cylinder section resting on the outer face of the bearing complex, said cylinder section having a smooth metallic upper face receiving the under face of the journal box, and metallic faces of the journal box and the cylinder section being relatively eccentric, whereby upon angular movements of the axle and bearing complex rotational force will be imparted to the cylinder section, effecting rotation and rise of the cylinder section and thereby raising the journal box along with the truck frame resting upon it.

4,026,218

RATTLE PROOF ANCHOR FITTING FOR SECURING LOADS TO A RETAINER TRACK

Ernest Prete, Jr., Woodland Hills, and Howard T. Knox, Hawthorne, both of Calif., assignors to Ancra Corporation, El Segundo, Calif.

Filed Sept. 8, 1975, Ser. No. 611,433

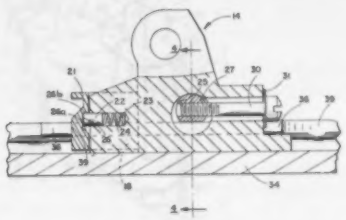
Int. Cl.² B60P *7/08;* **B61D** *45/00*

U.S. Cl. 105—482 **3 Claims**

1. In an anchor fitting for securing loads to a retainer track, said track having a top surface and a longitudinal slot and spaced notch portions separated by neck portions formed by a pair of oppositely positioned flanges, the anchor fitting having a pair of pad members positioned in the track slot under said pair of flanges and a latching plunger member positioned in one of the track member notches, the improvement being means for preventing the rattling of said fitting in said track comprising:

an apertured portion having an arcuate wall formed in said fitting,

a substantially cylindrical bar member placed in said apertured portion, the diameter of said bar member being less than that of said apertured portion, said bar member having a first surface which abuts against the surface of the track and a second substantially cylindrical surface



which abuts against the arcuate wall of said apertured portion, and

means for driving said second surface of said bar member slidably along the arcuate wall of said apertured portion and said first bar member surface slidably along the track surface whereby said driving action causes the first surface of said bar member to be cammmed against the top surface of the track, thereby causing the fitting to be driven upwardly relative to the track to bring the pad members into tight abutment against said flanges.

4,026,219

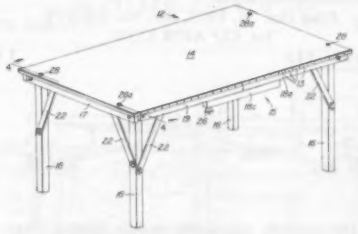
KNOCK-DOWN TABLE AND FOLDABLE SUPPORTING STRUCTURE THEREFOR

Robert N. Shupe, 3217 South 3075 East, Salt Lake City, Utah 84109, and David C. Haines, 107 B St. No. 406, Salt Lake City, Utah 84103

Filed Mar. 12, 1976, Ser. No. 666,204

Int. Cl.² A47B *3/06*

U.S. Cl. 108—62 **9 Claims**

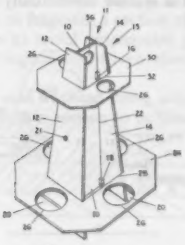


1. An improved, knock-down, portable table, comprising a reversible table top; supporting structure for the table top; and means for detachably fastening the table top to the supporting structure in either of its reversible positions, the fastening means being snap fasteners or the like, there being a set of two male snap fastener members secured to the top of the supporting structure and offset from one another at opposite ends thereof; sufficiently to effect diagonal bracing of the supporting structure and there being sets of correspondingly positioned, mating female snap fastener members inset into opposite faces of the table top, respectively, substantially flush with the corresponding faces.

4,026,220
PLANT STAND

John O. Schuring, Jr., 1322 Boston, SE., Grand Rapids, Mich. 49507

Filed Jan. 8, 1976, Ser. No. 647,351
Int. Cl.² A47G 7/02; A47F 7/28; A47B 47/00, 49/00
U.S. Cl. 108—101 11 Claims



1. A portable plant stand comprising:

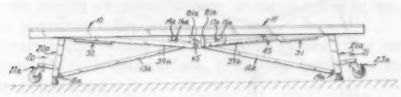
a tapered support column including two opposed side sections with a center section extending perpendicularly between and supporting the side section, the center and side sections being formed and interconnected such that the support column has a generally H-shaped horizontal cross section, the center and side sections being formed such that the support column tapers upwardly and inwardly from the bottom to the top of the support column;

at least one plant-holding shelf removably mounted on the support column, said plant-holding shelf having a central aperture therein that fits over the top of the tapered support column such that at least a portion of the shelf at the outer periphery of the aperture engages the outer side of the tapered support column at a predetermined position along the tapered support column, the shelf being supported at such position by wedging engagement of the shelf with the outer side of the tapered column.

4,026,221
MULTI-LEG MOBILE FOLDING STAGE

Kermit H. Wilson, Edina; Richard C. Bue, Chaska, and Ronald R. Carlson, Mound, all of Minn., assignors to Sico Incorporated, Minneapolis, Minn.

Filed Oct. 29, 1975, Ser. No. 626,979
Int. Cl.² A47B 85/00
U.S. Cl. 108—113 1 Claim



1. An elevationally adjustable mobile folding stage, comprising:

a. a first stage member being generally rectangular which is hingeably connected to a generally rectangular second stage member such that said first stage member and said second stage member are adjustable between an operational horizontal position in which the surfaces of said first and second stage members are generally coplanar and a second upright folded position in which the surfaces of said first and second stage members are generally parallel to each other;

b. a first pair of legs pivotally secured to the underside of said first stage member which are adjustable between two positions in response to movement of said first and second stage members between said horizontal operational position and said upright folded position such that when said first and second stage members are in said horizontal position said first pair of legs are in a first operational position which is generally perpendicular to the plane of said first stage member and when said stage members are in said upright folded position said first pair of legs are in a second position which is generally parallel to the plane of said first stage member, said legs including:

1. a generally horizontal support brace which extends between and is connected to each of said legs, and

2. a wheel means on each of said legs mounted such that when said legs are in said first position said wheel means are elevated above the legs and when said legs are in said second position said wheels are in contact with the floor to provide for and facilitate mobility of said folding stage;

c. a first pair of extension legs being longer than said first pair of legs on said first stage member hingeably mounted to the underside of said first stage member at one end of said legs and releasably engageable with said first stage member at the opposite end of said first pair of extension legs such that said first pair of extension legs are pivotal between a first storage position in which said extension legs are retained in a position generally parallel to the planar surface of said first stage member and a second operational position in which said extension legs are disengaged from said first stage member and extend downwardly from said first stage member generally perpendicularly;

d. means on said first stage member for releasably engaging said first pair of extension legs in said first storage position;

e. a second pair of legs pivotally secured to the underside of said second stage member which are adjustable between two positions in response to the adjustment of said first and second stage members between said horizontal and said folded position such that when said stage members are in said horizontal positions said legs are in a first operationl position which is generally perpendicular to the plane of said second stage member and when said stage members are in the upright folded position said legs are in a second position which is generally parallel to the plane of said second stage member, said legs including:

1. a generally horizontal support brace which extends between and is connected to each of said legs; and

2. a wheel means on each of said legs mounted such that when said legs are in said first position said wheel means are elevated above said legs and when said legs are in said second position said wheel means are in contact with the floor to provide for and facilitate mobility of said folding stage;

f. a second pair of extension legs, being longer than said second pair of legs on said second stage member, hingeably mounted to the underside of said second stage member at one end of said legs and releasably engageable with said second stage member at the opposite end of said second pair of extension legs such that said extension legs are pivotal between a first storage position in which said extension legs are retained in a position generally parallel to the planar surface of said second stage member and a second operational position in which said second pair of extension legs are disengaged from said second stage member and extend downwardly from said second stage member generally perpendicularly;

g. means on said second stage member for releasably engaging said second pair of extension legs in said first storage position;

h. a first counterbalance spring system mounted on the underside of said first stage member, said system including:

1. a spring means and housing therefor mounted along the underside of said first stage member;

2. a cable attached to one end of said spring means, said cable including a stop means thereon to retain said cable on said spring;
3. a first cam support linkage means being connected to said first stage member and said housing, said cam support linkage means extending across the underside of said first stage member and being pivotally connected to a second cam support linkage means near the juncture of said first and second stage members, said second cam support linkage means extending across said second stage member and being connected to the remote end of said second stage member, and
4. a cam means engageable with said cable, said cam means being positioned between and connected to said first cam support linkage means and said second cam support linkage means where said first and second cam support linkage means are joined;

i. a second counterbalance spring system mounted on the underside of said second stage member, said system including:
1. a spring means and housing therefor mounted along the underside of said second stage member;
2. a cable attached to one end of said spring means, said cable including a stop means thereon to retain said cable on said spring;
3. a first cam support linkage means being connected to said second stage member and said housing, said cam support linkage means extending across the underside of said second stage member and being pivotally connected to a second cam support linkage means near the juncture of said first and second stage members, said second cam support linkage means extending across said first stage member and being connected to remote end of said first stage member, and
4. a cam means engageable with said cable, said cam means being positioned between and connected to said first cam support linkage means and said second cam support linkage means where said first and second cam support linkage means are joined;

j. a first pair of extension legs, being longer than said first pair of legs on said first stage member, hingeably mounted to the underside of said first stage member at one end of said legs and releasably engageable with siad first stage member at the opposite end of said first pair of extension legs such that said extension legs are pivotal between a first storage position in which said extension legs are retained in a position generally parallel to the planar surface of said first stage member and a second operational position in which said first pair of extension legs are disengaged from said first stage member and extend downwardly from said first stage member generally perpendicularly;

k. means on said first stage member for releasably engaging said first pair of extension legs in said first storage position;

l. a second pair of extension legs, being longer than said second pair of legs on said second stage member, hingeably mounted to the underside of said second stage member at one end of said legs and releasably engageable with said second stage member at the opposite end of said second pair of extension legs such that said extension legs are pivotal between a first storage position in which said extension legs are retained in a position generally parallel to the planar surface of said second stage member and a second operational position in which said second pair of extension legs are disengaged from said second stage member and extend downwardly from said second stage member generally perpendicularly; and

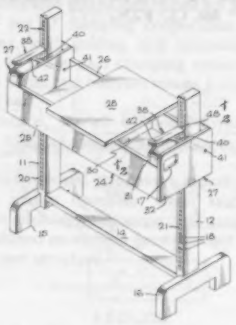
m. means on said second stage member for releasably engaging said second pair of extension legs in said first storage position.

4,026,222

ADJUSTABLE LOAD-SUPPORTING STRUCTURE

William F. Mueller, Tarzana, Calif., assignor to Christine E. Mueller, Tarzana, Calif.

Filed Apr. 12, 1976, Ser. No. 676,336
Int. Cl.² A47B 9/00
U.S. Cl. 108—146 **12 Claims**



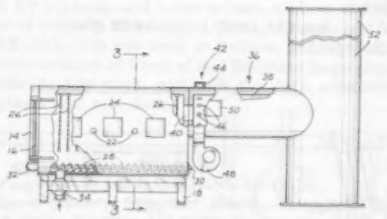
1. An adjustable load-supporting structure which comprises a stationary support member,
an adjustable member slidably mounted on said stationary member, said adjustable member having a surface substantially normal to the stationary member which is adapted to support a load and having channel means associated therewith in which said stationary member is slidably received, and
lever means extending between opposing ends of said channel means pivotally carried by the adjustable member and adapted to frictionally engage the stationary member in said channel means adjacent one end of the channel means and to exert a positive clamping mechanical advantage on said stationary member when a load is applied to said adjustable member.

4,026,223

SLUDGE INCINERATOR

Dean Robbins, Sherwood, Oreg., assignor to Chem. Pure West, Inc., Salem, Oreg.

Filed Jan. 29, 1976, Ser. No. 653,503
Int. Cl.² F23G 5/12; F23J 1/00
U.S. Cl. 110—7 B **11 Claims**



1. A sludge incinerator for evaporative separation of water, combustibles and non-combustible solids from a high moisture sludge, comprising:
a. an elongated primary chamber,
b. a plurality of sludge infeed means disposed at longitudinally spaced intervals in the primary chamber for feeding sludge into the primary chamber, and
c. a plurality of primary burners mounted in the primary chamber at longitudinally spaced intervals bracketing the

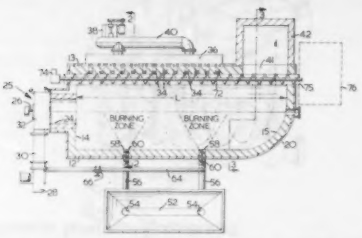
infeed means for flash evaporating the water from the sludge and igniting the combustible content of the sludge.

4,026,224

SLUDGE INCINERATOR

William K. Lombard, Weston, Canada, assignor to Trecan Limited, Canada

Filed Jan. 12, 1976, Ser. No. 648,321
Int. Cl.² F23G 5/12
U.S. Cl. 110—8 C **9 Claims**



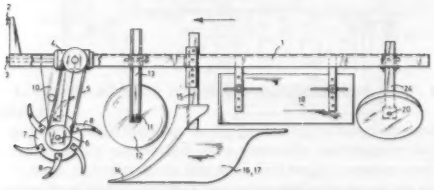
1. An incinerator for pasty or sludge-like wastes comprising: means defining an enclosed combustion chamber, said chamber including a fixed hearth defining a surface for the burning thereon of a layer of the waste material, means adjacent the hearth surface defining a waste inlet region and means at said region for introducing a layer of the waste material on to the surface of the hearth, an ash receiving region spaced from said waste inlet region, and wherein said surface of the hearth is sloped downwardly toward said ash receiving region to provide for movement of the burning waste materials toward said ash receiving region under the influence of gravitational forces thereon, the hearth surface as seen in transverse cross-section defining a generally continuous curve from said waste inlet region to said ash receiving region with the downward slope of such curve increasing generally continuously from the waste inlet region to the ash receiving region to compensate for the gradually increasing consistency of the burning materials and the consequent increasing resistance to movement thereof over said surface and to provide for their continued movement over the hearth surface.

4,026,225

MACHINE FOR PLANTING TREES, SHRUBS AND THE LIKE

Theodoor Johannes Vink, Ridderslag 9, Beesd, Netherlands

Filed Jan. 22, 1976, Ser. No. 651,486
Claims priority, application Netherlands, Jan. 22, 1975, 7500748
Int. Cl.² A01C 11/02; A01B 49/02
U.S. Cl. 111—2 **1 Claim**



1. In a machine for planting trees and the like, comprising a frame provided with a mechanism for coupling the frame to a tractor and for partial support by the tractor with the frame extending horizontally and to the rear of the tractor, a mechanism for coupling the power take-off shaft of the tractor to at least one tool carried by the frame, and drivable cutter means comprising said at least one tool and rotatable about a horizontal shaft for loosening the soil and coupled to said mechanism, and a coulter mounted to the frame and depending from that frame at the center line of the frame for forming a trench, the improvement wherein:

said cutting means comprises a single disc mounted for rotation about its axis and vertically disposed at the forward end of said frame and having a plurality of teeth mounted to its periphery, said teeth being curved radially and terminating in ends which are bent alternately in opposite axial directions away from said disc,

paired discs mounted about horizontal shafts on either side of the coulter and positioned to the rear of said single disc for loosening of the soil,

soil guide plates positioned on either side of the trench being dug and behind the coulter and between which, when the machine is advancing, the trees or shrubs to be planted may be placed,

vertical plate-like means mounted to said frame above the plane of said coulter and said soil guide plates and converging rearwardly behind the guide plates for filling in the trench in which the trees or shrubs have been planted, and

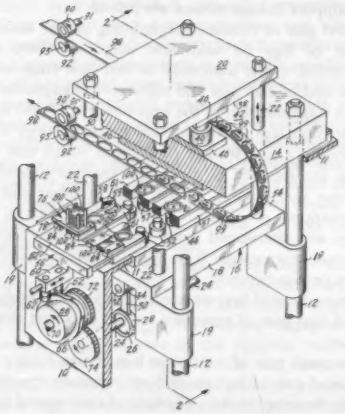
rollers mounted for rotation about their axes as hindmost tools on either side of the center line of the coulter and to the rear of said converging vertical plate-like means, said rollers being obliquely positioned such that their peripheries press the soil of the filled-in trench in the direction of the trench center line.

4,026,226

PRESS APPARATUS AND METHOD UTILIZING SAME

Kurt L. Hahn, San Rafael, and Robert J. Allen, Daly City, both of Calif., assignors to American Can Company, Greenwich, Conn.

Filed Mar. 1, 1976, Ser. No. 662,905
Int. Cl.² B21D 51/44, 43/05
U.S. Cl. 113—1 F **21 Claims**



1. A conversion press comprising: a frame; a pair of vertically-spaced rigidly, interconnected outer platens supported on said frame and having tooling disposed on the opposing faces thereof; an inner platen supported on said frame between said outer platens and having tooling disposed on each of the opposite faces thereof, the tooling on one of said opposing faces of said outer platens and on the confronting opposite face of said inner platen defining a first forming station, and the tooling disposed on the other of said opposing faces and on the confronting opposite face of said inner platen defining a second forming station, one of said inner platen and said pair of outer platens being mounted for vertical movement relative

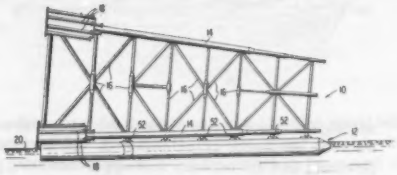
to the other and comprising movable means, said movable means enabling coaction of the tooling associated with both of said first and second forming stations; means for positively vertically reciprocating said movable means to alternately render operative said first and second forming stations; and means for transferring a workpiece from said first forming station to said second forming station for effecting sequential operations thereon.

4,026,227

METHOD AND APPARATUS FOR CONNECTING AND DISCONNECTING A SUPPORTIVE BUOYANT STRUCTURE TO AND FROM AN OFFSHORE TOWER JACKET

Arnold S. Cohn; Heinz K. Rohde, and Albert M. Koehler, all of Houston, Tex., assignors to Brown & Root, Inc., Houston, Tex.

Filed Sept. 2, 1975, Ser. No. 609,380
Int. Cl.² E02B *17/00*
U.S. Cl. 114—264 **14 Claims**



11. A method of connecting and disconnecting a supportive buoyant structure alternately to and from the tower jacket, said method comprising the steps of:

axially mating opposed stanchions extending between the buoyant structure and the tower jacket, with the tower jacket being carried by the buoyant structure;

clamping the mated stanchions together with spaced clamping means;

positively locking the mated stanchions in said clamped relation prior to transporting the tower jacket and the buoyant structure to a desired offshore location; positively unlocking the mating stanchions from said clamped relation subsequent to transporting the tower jacket and the buoyant structure to a desired offshore location;

releasing the mating stanchions from said clamped relation;

supporting said clamping means on said buoyant structure at locations separately spaced from said mated stanchions for guided and restrained movement, into and out of clamping cooperation with said mated stanchions;

retaining said clamping means on said buoyant structure subsequent to said releasing of said mated stanchions and separation of said buoyant structure and tower jacket;

providing actuating means carried by said buoyant structure and operable to effect said guided movement of said clamping means; and

effectively mutual telescoping of portions of said stanchions during said mating, with said telescoped portions being operable to resist relative, wave action induced movement between said tower jacket and said buoyant structure.

12. Apparatus for connecting and disconnecting a supportive buoyant structure alternately to and from the tower jacket, said apparatus comprising:

axially matable, opposed stanchions operable to extend between the buoyant structure and the tower jacket, with the tower jacket being carried by the buoyant structure;

spaced clamping means for clamping the mated stanchions together;

locking means for positively locking the mated stanchions in said clamped relation prior to transporting the tower jacket and the buoyant structure to a desired offshore location;

unlocking means for positively unlocking the mated stanchions from said lockingly clamped relation subsequent to transporting the tower jacket and the buoyant structure to a desired offshore location while maintaining a clamped relation between said stanchions;

means for releasing the mated stanchions from said clamped relation;

guiding and restraining means supporting said clamping means on said buoyant structure at locations separately spaced from said mated stanchions for guided movement, into and out of clamping cooperation with said mated stanchions; said guiding and restraining means being operable to retain said clamping means on said buoyant structure while said buoyant means is separated from said tower jacket;

actuating means, carried by said buoyant structure, and operable to effect said guided movement of said clamping means;

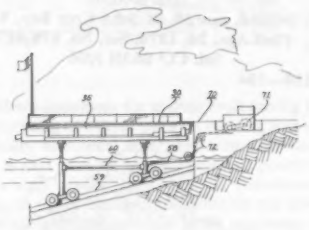
said matable, opposed stanchions including mutually telescopable : eans operable, when said stanchions are mated, to mutually telescope and resist relative, wave action induced movement between said tower jacket and said buoyant structure.

4,026,228

METHOD AND APPARATUS FOR TEMPORARILY CONVERTING CAMPERS AND THE LIKE TO WATER-BASED UNITS

Richard E. Reed, Rockford, Ill., and Raymond E. Reed, Carefree, Ariz., assignors to CAF Industries, Rockford, Ill.

Filed June 16, 1975, Ser. No. 587,244
Int. Cl.² B63B *1/14*
U.S. Cl. 114—61 **27 Claims**



27. A system of te type for converting a wheeled camper adapted for highway travel into a floatable craft adapted for water travel by loading the camper from a dock extending adjacent a body of water onto the deck of a floatation barge, wherein the improvement comprises:

means for engaging said barge to raise it above the water level of the body of water and into a proximate and fixed relationship with said dock to facilitate loading with the normal direction of travel of said floatation barge perpendicular to said dock, and with the deck substantially co-planar with said dock.

4,026,229

LEECH LINE LOCKING DEVICE

Stefan Georg Winberg, Osterskar, Sweden, assignor to Gran Segel Bromma Yachting AB, Vallingby, Sweden

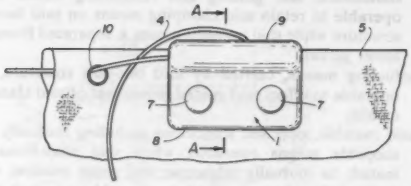
Filed May 27, 1976, Ser. No. 690,561
Claims priority, application Sweden, June 2, 1975, 7506261
Int. Cl.² B63H *9/10*
U.S. Cl. 114—102 **11 Claims**

1. A locking device for locking a leech line relative to a sail, comprising:

a plate member (1) having two spaced apart side members (6) defining a through-running slot (2) there-between therein for receiving an edge of a sail (5) in at least a portion of said slot (2), said slot (2) terminating in length-

wise running hollow space (3) in said plate member (1) in open communication with the portion of said slot which receives an edge of a sail (5), said space (3) receiving a leech line (4) passing through at least a portion of said space (3);

locking means (9) in open communication with said space (3) and the remainder of said slot (2) for locking said leech line (4) to said locking device, said locking means comprising a generally V-shaped groove (9) in a wall of



said plate member (1) defining said space (3), said generally V-shaped groove having its largest dimension portion opening at an edge of said plate member (1) for wedgingly receiving the leech line (4) therein and for providing at the edge opening of said generally V-shaped groove an entry opening for receiving a sail (5) during attachment of the locking device to a sail (5); and

means for fastening said plate member (1) to said sail (5) in said slot (2).

4,026,230

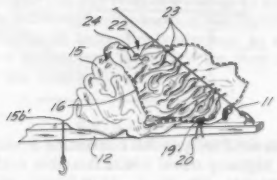
JIB BAG

Donald T. Wilford, Box 39, St. John Cruz Bay, V.I. 00830

Filed Apr. 20, 1976, Ser. No. 678,487

Int. Cl.² B63H *9/06*

U.S. Cl. 114—104 **10 Claims**



10. A sail assembly comprising:

a generally horizontal support;

a jibstay extending upwardly at an acute angle from said support;

a jib having a luff

a plurality of hanks securing said luff slidably along said jibstay; and

a bag containing said jib in a compacted condition thereof, enclosing said hanks, and surrounding a portion of said jibstay adjacent said support, said bag having a front edge generally parallel to said jibstay and provided with a separable fastener.

4,026,231

DEVICE FOR CONTROLLING BOAT SPEED

Irvin E. Fedorko, 22100 O'Conner St., St. Clair Shores, Mich. 48080

Filed Jan. 26, 1976, Ser. No. 652,101

Int. Cl.² B63H *25/44*

U.S. Cl. 114—145 A **7 Claims**

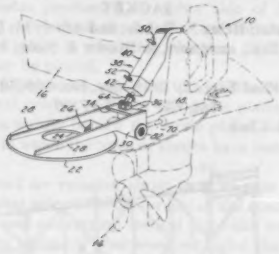
1. A trolling device adapted to be mounted on the movably supported outboard housing of a boat's propulsion unit, which housing has an upper mounting pivot and a lower and rearwardly disposed mounting pivot, comprising, in combination:

a trolling plate;

means for hinging the plate on the lower and rearwardly disposed mounting pivot of the outboard housing for swinging movement between a vertical position confronting the wash of a propeller on the housing and a horizontal position disposed out of the path of the propeller wash;

an elongated longitudinally extensible and contractable remotely operable powering unit;

means for connecting one end of the powering unit to the upper mounting pivot of the housing and means for con-



necting the opposite end of the powering unit to said plate whereby all forces of extension or contraction of the powering unit are between said upper mounting pivot on the housing and the trolling plate;

a source of power adapted to be mounted in the boat and including flexible power delivering means extending out of the boat and to said powering unit on the housing for delivering the power thereto;

and control means adapted to be mounted in the boat for manipulation by the boat operator for controlling delivery of power from said source to said powering unit to cause the same to be extended or contracted to lower or raise the trolling plate.

4,026,232

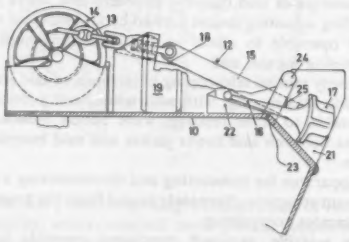
APPARATUS FOR STOWING AN ANCHOR

Hans-Arvid Genberg, Torslanda, Sweden, assignor to AB Gotaverken Company, Goteborg, Sweden

Filed Feb. 17, 1976, Ser. No. 658,268

Int. Cl.² B63B *21/22*

U.S. Cl. 114—210 **3 Claims**



1. Means for receiving and stowing an anchor, having a leg and a crown with arms pivotably connected thereto, on a ship defined by side plating and a deck, comprising:

a. an outwardly open pocket, recessed below said deck and being downwardly defined by a surface of sufficient size to receive the crown of said anchor, substantially inside of the contour line of said side plating,

b. an open bed arranged on said deck, inside said pocket

and including an inclined portion raising above said deck and adapted to receive the leg of said anchor, and

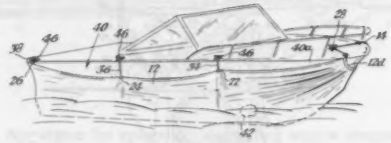
c. stopper means, including a pair of spaced-apart, upwardly extending stopper legs, fitted between the raised portion of said bed and said pocket for straddling the bed and the leg of an anchor resting thereon while permitting the arms of the anchor to be moved inwards outside of the stopper means.

4,026,233

PROTECTIVE HULL SAFETY COVER

Michael A. Cox, 4335 Palm Ave., West Palm Beach, Fla. 33406

Filed May 4, 1976, Ser. No. 683,029
Int. Cl.² B63B *43/16*
U.S. Cl. 114—229 **3 Claims**



1. A safety cover for deployment with a marine vessel which has sustained hull damage to prevent water damage from leaking into the vessel allowing the vessel to be moved with hull damage to a safe location comprising:

a flexible, waterproof thin sheet, said sheet being shaped and sized to cover the hull of a vessel, said sheet having a forward edge having a connector portion for receiving a rope or line;

a plurality of fastening means disposed along the edges and connected to said cover for attaching the cover to the hull of a vessel;

a boat stern end fastening means connected to the end edge portion of said flexible sheet;

a pair of elongated lines connected to the stern end portion of the cover, said lines being sized to be substantially the length of a particular vessel; and

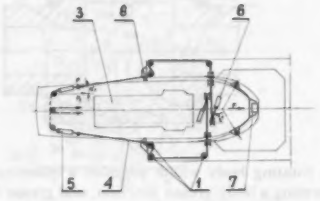
said sheet having a large, reinforced aperture disposed adjacent the stern end of the sheet for receiving the drive shaft of the propeller.

4,026,234

DEVICE FOR COUPLING A BARGE UNIT TO A PUSHER-TUG FOR SEA TRANSPORT

Wojciech Zbilut; Walerian Dobromirski, and Jerzy Wojtasik, all of Wroclaw, Poland, assignors to Centrum Badawczo-Projektowe Zeglugi Srodladowej, Wroclaw, Poland

Filed Oct. 16, 1975, Ser. No. 623,067
Claims priority, application Poland, Oct. 19, 1974, 174962
Int. Cl.² B63B *21/00*
U.S. Cl. 114—248 **3 Claims**



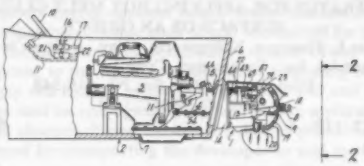
1. A device for coupling a barge unit to a pusher-tug for sea transport, the barge unit having a stern portion with a nest and the tug having a bow adapted for nesting in said nest, said device comprising guiding rollers mounted on the barge on a line perpendicular to the symmetry plane of the pusher-tug, said symmetry plane passing through the center of buoyancy of the pusher-tug lying idle in water, two coupling cables passing on said rollers, said cables having opposite ends, shock absorbers on said tug connected to one of the ends of the cables, hydraulic power devices on said tug connected to the other of the ends of the cables, the pusher-tug being nested against and pushing against the nest provided in the stern portion of the barge, said cable having an inclination angle α_1 with respect to the symmetry plane of the tug at a first end of the cable and an inclination angle α_2 at a second end of the cable, said angles being selected such that for a preload in the cable equal to force P as developed by the hydraulic power devices, the difference between P cos α_1 and P cos α_2 is at least equal to one-half of the force tending to separate the pusher-tug and the barge, each shock absorber having a stroke equal to the elongation of the cable at extreme positions of the pusher-tug as determined by the pitching and heaving amplitude of the pusher-tug relative to the barge unit.

4,026,235

JET DRIVE APPARATUS WITH NON-STEERING JET REVERSE DEFLECTOR

William L. Woodfill, Fond du Lac, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed Apr. 19, 1976, Ser. No. 678,075
Int. Cl.² B63H *11/00*
U.S. Cl. 115—12 R **23 Claims**



1. A jet drive apparatus for marine craft having jet forming means for forming of a drive jet, a jet steering means mounted on a generally horizontal trim axis, trim positioning means connected to said jet steering means for trim positioning of the drive jet, a shift means adapted to be positioned over the steering means for reversing of the drive jet and developing of a reverse thrust, the improvement in the mounting of the shift means for maintaining a preset drive position of the shift means during trim positioning of the steering means comprising a fixed pivot support means for said shift means having an axis coaxially of the horizontal trim axis, shift control linkage means for selectively positioning of the shift means in overlying orientation with respect to the steering means, a trim coupling means connected to said trim positioning means and to said shift means and establishing movement of the shift means with said steering means to maintain the preset drive position with respect to said steering means, said shift control linkage means including first and second movable members moving relatively in response to movement of the shift means with the trim positioning means to maintain connection to the shift means without repositioning of the shift means relative to the jet steering means.

4,026,236

WATER SKI LOCATING DEVICE

Roy F. Robbins, Cottage Grove, Minn., assignor to Louis G. Ernster, Inver Grove Heights, Minn.

Filed Sept. 15, 1975, Ser. No. 613,349
Int. Cl.² A63C *15/06*
U.S. Cl. 116—124 R **3 Claims**

1. A device for signaling the location of a floating water ski comprising:

mounting means for attaching the device to the lateral edge of a water ski,

a flexible mast extending from both the upper and lower surfaces of said mounting means when attached, and signal means positioned at each extremity of said mast, said

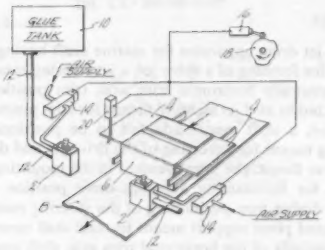
mast flexing to a rearwardly retracted position in response to water pressure generated during movement of the ski through the water in use and springing to the upright position when the ski lies still in the water.

4,026,237

APPARATUS FOR APPLYING HOT MELT GLUE TO A SURFACE OF AN OBJECT

Thomas L. Flanagan, Killingworth, Conn., assignor to Emhart Industries, Inc., Farmington, Conn.

Filed Oct. 1, 1975, Ser. No. 618,548
Int. Cl.² B05C *5/02*
U.S. Cl. 118—5 **8 Claims**



1. Apparatus for applying hot melt glue to a surface of an object moving relatively to the glue applying apparatus, comprising:

a valve housing having a bore therein, said bore terminating in a glue outlet orifice at one end thereof and having a glue inlet, said valve housing being adapted to be disposed such that said orifice is adjacent the surface upon which glue is to be applied and such that an outer surface of said valve housing is contactable by the surface upon which glue is to be applied;

a vaive stem reciprocably disposed in said bore, said valve stem having valve means at one end thereof for cooperating with said orifice to control the flow of glue therethrough by opening and closing said orifice;

means for reciprocating said valve stem; and

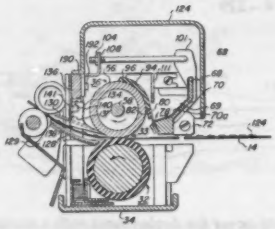
a slot disposed in said outer surface of said valve housing in fluid communication with said orifice and oriented such that the longitudinal dimension of said slot lies substantially parallel to the direction of travel of the surface upon which glue is to be applied, said slot having a cross-sectional area which is smaller than the cross-sectional area of said orifice, the length of said slot being sufficient to hold an amount of glue remaining in said slot after said valve means has closed said orifice until the moving surface draws the glue from within said slot.

4,026,238

APPARATUS FOR APPLYING RELEASE MATERIAL TO A CONTACT FUSER ROLL MEMBER UTILIZED IN FIXING TONER IMAGES TO SUPPORT SHEETS

Ari Bar-on, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 482,727, June 24, 1974, Pat. No. 3,918,804. This application July 21, 1975, Ser. No. 597,611
Int. Cl.² B05C *11/00*
U.S. Cl. 118—60 **4 Claims**



1. Release material applicator structure for utilization in a heat and pressure fuser including a heated fuser roll for fixing toner images to support sheets, said structure comprising:

a sump for containing release material;

release material disposed in said sump for contacting a heated fuser roll, said release material being solid at room temperature and being liquid at the operating temperature of a heat and pressure fuser; and

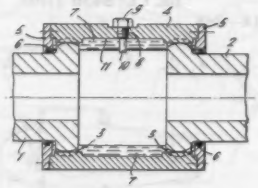
means supported by said sump for maintaining said release material in contact with a fuser roll structure when said release material is solid, said means supported by said sump comprising a collector bar disposed adjacent a fuser roll structure, said collector bar restricting movement of said release material our of contact from a fuser roll when the release material is solid.

4,026,239

GREASE LEVEL INDICATOR

Tore A. Andvig, Kongsberg, Norway, assignor to A/S Kongsberg Vapenfabrik, Kirkegardsveien, Norway

Filed Dec. 3, 1975, Ser. No. 637,195
Claims priority, application Norway, Dec. 3, 1974, 744349
Int. Cl.² G01F *23/00*
U.S. Cl. 116—118 R **1 Claim**



1. In a rotating body which includes a quantity of grease therein forming a body/grease junction, said grease forming an annular ring therein, an indicator for indicating the thickness of said annular ring, said indicator comprising:

means defining a radial opening through said rotating body;

plug means for removably sealing said means defining a radial opening;

tubular extension means, included on said plug means, for

extending through said annular grease ring, said tubular extension means including inner and outer walls; and

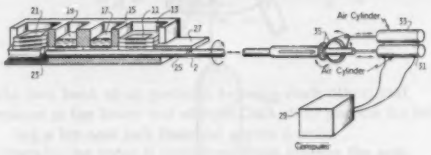
means defining an aperture in said tubular extension means for placing said inner and outer walls in communication at said body/grease junction.

4,026,240

LIQUID PHASE EPITAXIAL REACTOR APPARATUS

Dennis C. DeFevere, Palo Alto, and Raymond Solomon, Sunnyvale, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Nov. 17, 1975, Ser. No. 632,541
Int. Cl.² B01D *9/00*; **B05C** *3/02*, *3/18*; **H01L** *40/00*
U.S. Cl. 118—415 **5 Claims**



1. Apparatus for epitaxially depositing source materials on semiconductor wafer, comprising:

a housing including a plurality of cavities therein;

a melt in one of said cavities, said melt containing a source material to be deposited;

an input stack of semiconductor wafers awaiting epitaxial deposition, said input stack being positioned in a second one of said cavities;

an output stack of semiconductor wafers having received epitaxial deposition, said output stack being positioned in a third one of said cavities;

a shaft mounted in said housing for translation and rotation, translation of said shaft acting to drive wafers from a position in said input stack to a position in contact with said melt, and to drive wafers away from said melt into a position in said output stack; and

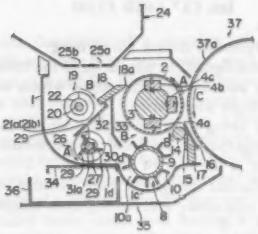
a cam interconnected with said shaft for rotation in response to rotation of said shaft to tilt said output stack preparatory to a wafer being positioned therein.

4,026,241

MAGNETIC BRUSH DEVELOPING DEVICE FOR USE IN ELECTROPHOTOGRAPHIC COPYING APPARATUS

Kaoru Takebe, and Tetsuya Utsumi, both of Toyokawa, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed May 23, 1975, Ser. No. 580,264
Claims priority, application Japan, June 4, 1974, 49-63517
Int. Cl.² G03G *15/08*, *15/09*
U.S. Cl. 118—653 **3 Claims**



1. In an electrophotographic reproducing apparatus including a photosensitive member for receiving and carrying an electrostatic latent image on the surface thereof, a developer housing with a toner supply device and a magnetic brush developing device in which magnetic brush bristles are formed on the outer peripheral surface of the applicator roll, the applicator roll having therein fixed magnetic means and being rotatable in a particular direction so that the magnetic brush bristles slidingly contact the surface of the photosensitive member, thereby developing the latent image and depleting the developer of toner, the improvement comprising:

a first agitating roll located proximate said applicator roll and below said toner supply device and including a plurality of pairs of discrete successive adjoining helical agitating members of alternately opposite orientation on the axis of said first roll for agitating the developer transported from said applicator roll with freshly supplied toner supplied from said toner supply device in the axial direction as well as in a rotational direction of said first agitating roll;

a scraper plate bridging between said applicator roll and said first agitating roll and having one end immediately adjacent said applicator roll for gravity transporting the residual toner to said first agitating roll;

a second agitating roll disposed below said first agitating roll;

a baffle having one end abutting said scraper plate and extending downwardly in close proximity to said first agitating roll and substantially interposed between said first agitating roll and said second agitating roll to prolong the agitating action of said first roll upon the residual toner and freshly supplied toner;

said second agitating roll having a plurality of agitating blades and further having at least two additional agitating members having opposite helical blades thereon located at respective opposite ends of said second roll for directing the flow of developer toward a center of the roll in response to the rotation of said second agitating roll;

a supply roll located below said applicator roll and proximate said second agitating roll and having a plurality of axial channel-shaped buckets on the peripheral surface thereof for transporting the developer to said applicator roll;

a bristle-height limiting roller spaced from said applicator roll and mounted for free rotation in a direction counter to that of said applicator roll, said counter rotation being frictionally induced by forces generated by the contact of said bristles with said bristle-height limiting roller; and

means for rotating said first agitating roll and said supply roll in a direction opposite to that of said applicator roll and rotating said second agitating roll in the same direction as that of said applicator roll.

4,026,242

MATRIX SUPPORTING DEVICE IN ELECTROSTATIC DEVELOPMENT APPARATUS

Vittorio Boschet, Milan, Italy, assignor to Grafosol S.p.A., Milan, Italy

Filed June 2, 1975, Ser. No. 582,615
Claims priority, application Italy, June 28, 1974, 24540/74
Int. Cl.² G03G *15/09*
U.S. Cl. 118—657 **5 Claims**

1. A matrix supporting device in an electrostatic developing apparatus, comprising:

a magnetic developing roller for applying toner to the exposed surface of said matrix:

means defining a rotatable cylindrical surface; and

means for spacing the axis of rotation of said cylindrical surface at a fixed spacing from that of said roller; and

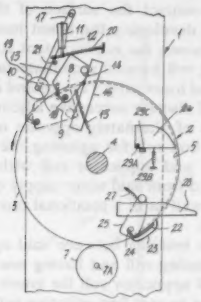
wherein said means defining a rotatable cylindrical surface includes:

a cylindrical skirt portion for receiving said matrix; and

a pair of rocker clamps for releasably clamping the leading and trailing edges of said matrix at the outer circumferentially spaced edges of said skirt portion; and

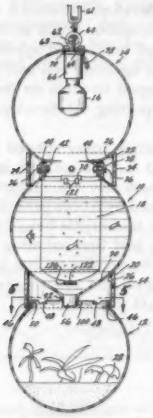
said device further comprising:

means for pressing said matrix against said cylindrical



skirt; and means for stepping said pressing means over said clamps as said skirt rotates.

4,026,243
AQUARIUMS
Quenton W. Jessop, III, 2351 Spruce St., Carlsbad, Calif. 92008
Filed July 17, 1975, Ser. No. 596,919
Int. Cl.² A01K *63/00, 64/00*
U.S. Cl. 119—5 **23 Claims**



1. A combined aquarium-terrarium, comprising:
a. a terrarium and an aquarium each being a small container made at least partly of transparent material and being closed at least except at its top,
b. said aquarium having bottom water outlet means through which water may be discharged and an on-off manually operable closure for said outlet means controlling periodic manually operated discharge through said outlet means,
c. said aquarium being disposed above said terrarium and said outlet means being operable to discharge by force of gravity into said terrarium when said closure is periodically opened, whereby said terrarium will receive water and food and fish waste from said aquarium as a source of moisture and nourishment, and
d. said aquarium and said terrarium each being generally bulbous shaped, said aquarium being superposed to said terrarium and having a bottom sloping to said water outlet means, said terrarium having an upper end with an opan mouth and the lower end of said aquarium including said outlet means extending into and nesting within said mouth of said terrarium below the plane of the top of said terrarium.

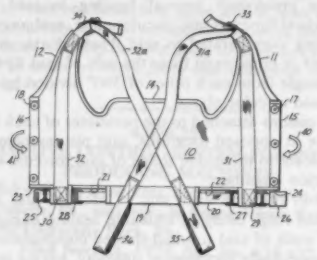
4,026,244
BIRD FEEDER
Ralph A. Salick, 6948 N. Wildwood Pt., Hartland, Wis. 53209
Filed June 2, 1975, Ser. No. 583,197
Int. Cl.² A01K *39/01*
U.S. Cl. 119—51 R **3 Claims**

1. A bird feeder comprising
a. a body having a pliable configuration to contain feed
b. one or more feed openings on the periphery of said body
c. a perch bar extending traversely from the body in the proximity of each feed opening to permit a bird to extract feed particles while feeding therefrom, with
d. the body sealed at one end to provide a cavity for feed,
e. a closure means operative after filling with feed to close the body and fully contain the feed therein,
f. a pointed perch bar to peripherally penetrate the body in approximate diametral relationship to create feed openings, with
g. the pointed bar further adapted to penetrate the body material in a diametral relationship beneath each of the feed openings, and with
h. the pointed perch bar of a length to extend through the body and from opposite sides thereof to provide a perch upon which a bird may alight and extract feed from a feed opening above the perch.

4,026,245
PERSONAL RESTRAINT DEVICE
Charles J. Arthur, Pasadena, Calif., assignor to Sierra Engineering Co., Sierra Madre, Calif.
Filed Jan. 21, 1976, Ser. No. 651,021
Int. Cl.² A62B *35/00*
U.S. Cl. 119—96 **6 Claims**

1. A personal restraint device comprising:
a vest portion configured to pass around the torso, having a bottom edge and having side edges which substantially meet at the front when worn;
fastener means along the side edges adapted to fasten the side edges together at the front of the torso so that the vest is closed at the rear of the torso;
a vest belt attached along the bottom edge, adapted to encircle the mid-torso, and having ends adapted to meet at the front;
means at said ends for buckling the vest belt at the front;
a pair of front strap portions attached at their bottom edges at the front portion of the vest, extending upward along said front portion, and over a respective shoulder, each front strap portion being spaced somewhat from a respective side edge;

a pair of rear strap portions attached at the bottom edge at the back portion of the vest, extending upward along said back portion to meet and hold to a respective front strap portion;



the two back strap portions crossing each other; and

means at the lower end of each back strap portion for holding a lap seat belt fastened across a seat;

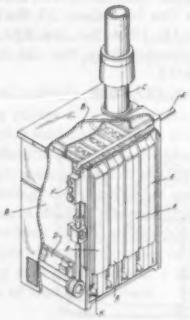
whereby the torso is restrained from leaving the seat.

4,026,246

BOILER FOR CENTRAL HEATING INSTALLATIONS AND HEAT EXCHANGE ELEMENTS FOR SAID BOILER

Augusto Colle, Milan, Italy, and James Fisher, Gland, Switzerland (4), assignors to American Standard, Inc., New York, N.Y.

Filed Mar. 5, 1975, Ser. No. 555,652
Int. Cl.² F22B *23/00*
U.S. Cl. 122—225 R **3 Claims**



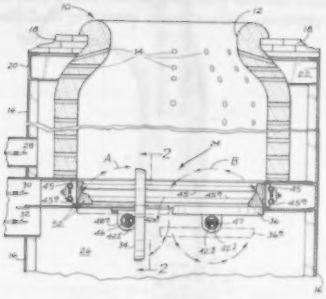
1. A boiler consisting of a plurality of coupled heat exchanger sections to be filled with water, each section including two side legs, a basal leg fluidically interconnecting the bottoms of the side legs and a compartment segment fluidically connected to the tops of said side legs, a fire box bounded by said side legs, basal legs and said compartment segments, the heat emanating from the fire box being directly applied to said side legs, basal legs and said compartment segments, and said compartments of each heat exchanger section being defined by two parallel walls, each wall having a plurality of equispaced outwardly projecting ribs disposed thereon to define a curvilinear path between adjacent ribs, the ribs formed on said one wall being antisymmetrical with the ribs formed on the other wall of said compartment segment and each rib of each wall having spaced fins or cusps and each fin or cusp having a height so as to be spaced from the fins branching from the ribs of an adjacent heat exchanger section.

4,026,247

FLUID COOLED DUMP GRATE

Allen Jacob Jones, Grants Pass, Oreg., assignor to S. J. Agnew, Tenino, Wash.

Filed Dec. 15, 1975, Ser. No. 640,895
Int. Cl.² F23H *3/04*
U.S. Cl. 122—371 **9 Claims**



7. Apparatus for supporting burning fuel within a furnace and operable for dumping said fuel, when spent, comprising:

grate means for supporting fuel thereon including a grate coolant tube for receiving fluid, said grate means also including a base plate and an upper layer of refractory material attached thereto, said refractory material defining a thickness in which said tube is supported and substantially embedded;

means for tilting said grate means from a substantially horizontal fuel supporting position to a nonhorizontal position for permitting spent fuel to fall from said upper surface; and

means for continuously introducing and discharging fluid into and from said tube when said grate means is disposed both substantially horizontally and nonhorizontally.

4,026,248

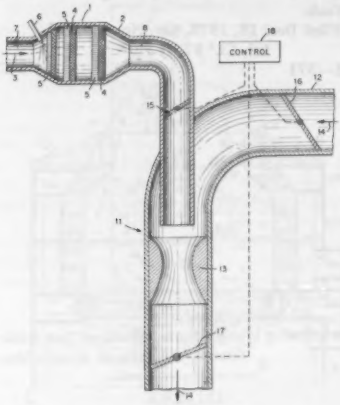
ARRANGEMENT FOR STABILIZATION OF FLOW IN A REACTION CARBURETOR

Wenpo Lee, Wolfsburg, Germany, assignor to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

Continuation of Ser. No. 429,624, Dec. 28, 1973, abandoned. This application July 11, 1975, Ser. No. 594,969
Int. Cl.² F02B *43/08*
U.S. Cl. 123—3 **5 Claims**

1. In a reaction carburetor, containing at least one catalyt arranged in the flow path of a fuel-air mixture, for catalytic conversion of fuel from the liquid to the gaseous state, the improvement comprising means for stabilizing the flow in said carburetor, said stabilizing means including at least one temperature-stable, non-catalytically active body arranged in the

said flow path immediately ahead of said catalyst and having a plurality of flow channels extending therethrough in the direction of said flow path and of sufficient length to create substantially laminar flow of said fuel-air mixture.



4,026,249

ROTARY CYCLOIDAL CONTINUOUS TOROIDAL CHAMBER INTERNAL COMBUSTION ENGINE

Carlos Ayesta Larrea, Zurbaran, 43 - Bilbao, Spain

Continuation of Ser. No. 450,194, March 11, 1974, abandoned. This application Nov. 19, 1975, Ser. No. 633,251
Claims priority, application Spain, Mar. 14, 1973, 412626
Int. Cl.² F02B *53/00*
U.S. Cl. 123—8.47 **10 Claims**

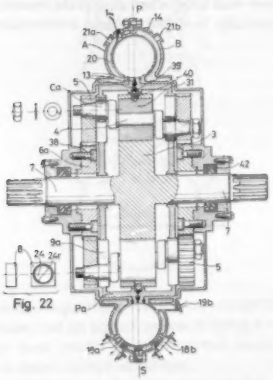


Fig. 22

1. In a rotary internal combustion engine comprising:

a. a housing forming a toroidal-shaped combustion chamber containing a continuous circular slot at the minimum diameter of said toroidal shaped combustion chamber;

b. a plurality of hat shaped circular plates having concavities, the periphery of said circular plates slideably engaging with and sealing said slot, the center of said plates containing a concentric circular hole adapted to the passage therethrough of an engine shaft, said plates being adapted to rotational motion independently of each other, the concavities of said hat shaped circular plates being assembled facing each other whereby a central disc-shaped space is formed;

c. a disc-shaped flywheel disposed within and coaxial with said central disc-shaped space;

d. two engine shafts extending axially outward in opposite directions from said flywheel and thence through said concentric circular holes, the outer ends of said engine shafts being adapted to the transmission of power to a load;

e. one crankshaft journal bearing in said disc-shaped flywheel for each said circular plate, said journal bearings having axes parallel to said flywheel axis and being located at equal radii from the axis of said flywheel and at an angle from each other of 360° divided by the number of said circular plates;

f. two pistons attached to the perimeter of each said circular plate at opposed locations, said pistons being shaped to conform to the inside shape of said toroidal-shaped combustion chamber;

g. piston rings on each end of each of said pistons, said piston rings being in slideable sealing engagement with the walls of said toroidal-shaped combustion chamber;

h. an essentially rectangular slideway, having its longer side in the radially direction, in each of said circular plates;

i. a slideable shoe containing a transverse hole adapted to radial slideable displacement in each of said rectangular slideways;

j. a crankshaft having a journal bearing and at least one crank arm mounted in each crankshaft journal bearing;

k. a crankpin bearing on the inner end of each crankpin, said crankpin bearing being in slideable engagement with the said hole in said slideable shoe;

l. an eccentric gear on the outer end of each crankpin, said gear being eccentric with said crankpin but concentric with said crankshaft journal; and

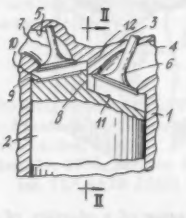
m. at least one stationary gear in cooperative mesh with each of said eccentric gears, said stationary gear having a pitch radius essentially equal to the pitch radius of one eccentric gear as measured from said journal bearing axis times the number of said circular plates.

4,026,250

EXPLOSION INTERNAL-COMBUSTION ENGINES

Angelo Funiciello, Via San Sebastiano 33, Bergamo, Italy

Filed Nov. 15, 1974, Ser. No. 524,264
Claims priority, application Italy, Nov. 30, 1973, 31969/73; June 19, 1974, 24136/74
Int. Cl.² F02B *23/00*
U.S. Cl. 123—32 B **10 Claims**



1. Improvements in or relating to explosion internal-combustion engines, comprising a cylinder having a cylinder head and a piston movable in said cylinder, having an axis in common therewith, and cooperating therewith to define a variable volume chamber, in which the motive fluid is effective, said cylinder head having an inner surface directed toward said piston and said piston having an end surface directed toward said cylinder head, and the latter surfaces respectively being formed each with a step extending transversely with respect to said axis and said steps overlapping each other as the variable volume chamber reaches its minimum volume, when the piston approaches an outer dead center position, said steps while extending across central portions of said piston and cylinder head surfaces being interrupted at least one end in the region of side surfaces of said piston and cylinder for defining a barrier dividing said volume into two spaces or compartments

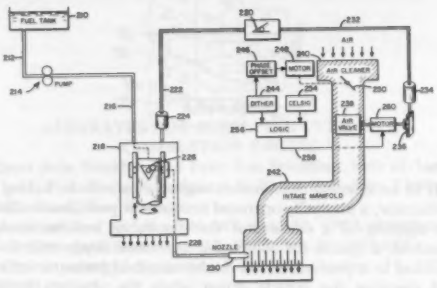
which are intercommunicating for at least a fraction of the time during which said steps overlap each other to lengthen the path of fluid flow from one to the other of said spaces or compartments by requiring the fluid to travel around the barrier, at least one induction valve and at least one exhaust valve respectively situated on opposite sides of the step of said cylinder head, thereby causing gases to have an extended path of travel in order to move from said induction valve to said exhaust valve.

4,026,251

ADAPTIVE CONTROL SYSTEM FOR POWER PRODUCING MACHINES

Paul H. Schweitzer; Carl Volz, and Thomas W. Collins, all of State College, Pa., assignors to Pennsylvania Research Corporation, University Park, Pa.

Filed Nov. 26, 1975, Ser. No. 635,437
Int. Cl.² F02B *3/02, 3/12, 3/04*
U.S. Cl. 123—32 EA **9 Claims**



1. An adaptive electronic control system for maximizing the speed of an engine shaft for a given setting of an engine speed modifying parameter, comprising:

a. first means for producing regularly occurring dither pulses of a frequency, f_1;

b. means coupled to receive said dither pulses for varying said parameter at said frequency, f_1, about said given setting;

c. second means coupled to said shaft for continuously producing pulses at a rate substantially greater than the rate at which said dither pulses are produced and proportional to the instantaneous angular velocity of said shaft;

d. digital logic means coupled to said first and second means for comparing the number of pulses produced by said second means during the period of one-half of first and second portions of said dither pulses; and

e. means responsive to the output of said digital logic means for varying said parameter in a direction determined by the results of said comparison.

4,026,252

ENGINE CONSTRUCTION

John W. Wrin, 1615 East Ave., Q-11, Palmdale, Calif. 93550

Filed Aug. 8, 1975, Ser. No. 602,925
Int. Cl.² F02B *75/24*
U.S. Cl. 123—56 BC **11 Claims**

1. An engine comprising:

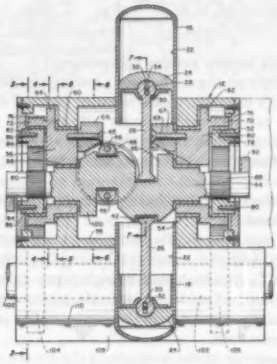
a housing;

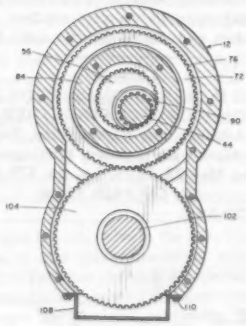
a pair of cylinders attached to said housing arranged in an oppositely facing in-line manner;

a piston movably mounted within each of said cylinders, each said piston connected to a connecting rod, each said connecting rod being rotatably mounted upon a crank pin of a crank shaft, said connecting rods having a rotational axis defined as a first axis, said first axis being displaced from the axis of said crank shaft;

a planet gear assembly attached to said crank shaft with the rotating axis of said planet gear assembly coinciding with said crank shaft axis, said planet gear assembly including at least one in number of planet gears, said planet gear assembly operatively connected with an internal ring gear assembly, said internal ring gear assembly including at least one in number of internal ring gears, the diameterof said planet gear being one-half the diameter of said internal ring gear; and

a planetary crank carrier assembly located about said crank shaft, said planetary crank carrier assembly including at least one in number of planetary crank carriers, said crank shaft being rotatably mounted within said planetary crank carrier assembly, said planetary crank carrier assembly being rotatably mounted to said housing, said crank shaft being eccentrically located with respect to the rotating axis of said planetary crank carrier assembly, a said planetary crank carrier located between a said crank pin and a said internal ring gear, said planetary crank carrier assembly being operatively connected to an output gear assembly which is connected to an output shaft.

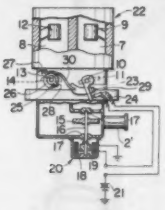




4,026,253
FUEL-AIR MIXTURE SUPPLY SYSTEM

Katsumi Nishino, and Toshiaki Konomi, both of Susono, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Apr. 5, 1974, Ser. No. 458,135
Claims priority, application Japan, May 11, 1973, 48-51628
Int. Cl.² F02M 19/00
U.S. Cl. 123—127 9 Claims



6. A fuel-air supply system comprising:

a two-barrel carburetor having a primary side mixture passage and a secondary side mixture passage therein, a first throttle valve in said primary side mixture passage, said first throttle valve being rotatable about an axis, and a second throttle valve in said secondary side mixture passage.

said first throttle valve being operatively associated with said second throttle valve,

an intake manifold fluidly communicating with said carburetor, said intake manifold having branch pipes and a junction from which said branch pipes extend,

the center axis of said primary side mixture passage being substantially aligned with the center of the junction of the intake manifold,

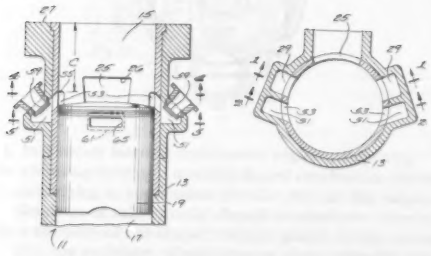
a rotary member in the junction of the intake manifold, and

means for controlling rotation of said rotary member, said means being operable to stop rotation of said rotary member when said second throttle valve is opened.

4,026,254
TWO STROKE INTERNAL COMBUSTION ENGINE AND METHOD OF OPERATION THEREOF

Josef Ehrlich, Ashridge near Berkhamsted, England, assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed May 22, 1975, Ser. No. 579,808
Int. Cl.² F02B 33/04
U.S. Cl. 123—73 AA 33 Claims

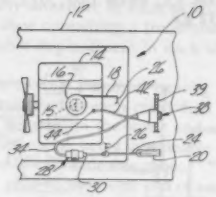


14. A method of operating an internal combustion engine including a cylinder, a crankcase extending from the cylinder, a piston movable relative to the cylinder between top dead center and bottom dead center positions, a source of fuel, a transfer passage communicating with the crankcase and with the cylinder in response to piston travel, a chamber separate from the transfer passage and communicable with the cylinder and with the crankcase in response to piston movement, and a source of fresh air, said method including the steps of supplying fresh air to the chamber from the source of fresh air during piston travel adjacent to top dead center position, thereafter, during piston movement away from top dead center position, isolating the air introduced into the chamber from the cylinder and the crankcase, and subsequently, during further piston movement away from top dead center position, supplying to the cylinder the air in the chamber, and thereafter, during still further piston movement away from top dead center position, supplying fuel to the cylinder through the transfer passage.

4,026,255
VEHICLE ENGINE SIGNAL DEVICE

Charles A. Weiler, Jr., 2711 Jossman, Holly, Mich. 48442

Filed Jan. 9, 1976, Ser. No. 647,702
Int. Cl.² F02D 11/08
U.S. Cl. 123—103 E 2 Claims



1. In an internal combustion engine of a vehicle having a carburetor, a manually operated accelerator pedal controlling the opening of a carburetor throttle valve, and an intake manifold, a system for comparing the actual intake manifold pressure to a predetermined intake manifold pressure setting and signaling the vehicle driver when the absolute intake manifold pressure increases above said predetermined setting, said system comprising:

a control mechanism having a pressure responsive movable wall;

first means for generating a force resisting movement of said wall in a first direction, said force being a function of said predetermined intake manifold pressure setting;

second means communicating said intake manifold pressure to said pressure responsive wall for generating a second force acting on said movable wall and opposing said first-mentioned force for moving said wall when said manifold pressure exceeds said predetermined setting;

actuator means having a bore;

piston means movably mounted within said bore dividing same into first and second pressure chambers, said piston being connected to said accelerator pedal and movable in a first direction to decrease the opening of said throttle valve, one of said pressure chambers communicating with atmospheric pressure for generating a force on said piston to move said piston in said first direction; and

valve means operable upon movement of said wall for communicating said other pressure chamber to said intake manifold pressure whereby said piston means is moved in said first direction due to the pressure differential thereacross.

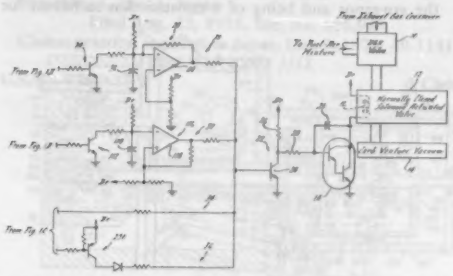
4,026,256
ENGINE EXHAUST GAS RECIRCULATION (EGR) CONTROL SYSTEM

Gordon William Fenn, Mount Clemens, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Filed May 10, 1976, Ser. No. 685,012
Int. Cl.² F02M 25/06
U.S. Cl. 123—119 A 15 Claims

10. In an internal combustion engine exhaust gas recirculation system wherein the amount of engine exhaust gas recirculated is controlled by an exhaust gas recirculation valve in accordance with one or more individual control inputs, the

improvement wherein one of said control inputs comprises: means responsive to the pattern of past history of a selected



engine operating characteristics for presently controlling the amount of exhaust gas recirculated.

4,026,257

APPARATUS FOR SUPPLYING FUEL TO A COMBUSTION ENGINE

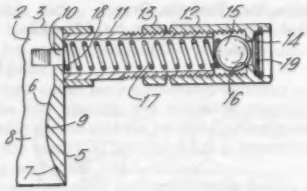
Albert John Madden, and Peter Lee Spedding, both of Auckland, New Zealand, assignors to Exhal Industries Limited, Auckland, New Zealand

Continuation of Ser. No. 391,247, Aug. 24, 1973, abandoned. This application Sept. 25, 1975, Ser. No. 616,633

Claims priority, application New Zealand, Aug. 24, 1972, 168201

Int. Cl.² F02M *23/04*

U.S. Cl. 123—124 R **13 Claims**



1. Apparatus for incorporation into the induction system of an internal combustion engine adapted to burn liquid fuel in a vapor form, which induction system includes a primary fuel vaporization means and a fuel vapor inlet tract having walls and an axis, said apparatus comprising a body inserted into said fuel vapor inlet tract intermediate of said primary fuel vaporization means and the combustion chamber of said engine, said body comprising a first portion defining a first aperture converging in the direction of fuel vapor flow and a second portion defining a second aperture having an inlet substantially coindent with the outlet of said first aperture, said second aperture diverging in the direction of fuel vapor flow, the inlet to said first aperture and the outlet from said second aperture being arranged to substantially conform with the walls of said fuel vapor inlet tract at their points of juncture, said members defining said first aperture subtending an angle of not greater than 45° with the axis of said inlet tract at the inlet to said first aperture and said members defining said second aperture subtending an angle of not greater than 20° with the axis of said inlet tract at the outlet from said second aperture so as to not significantly increase the level of turbulence in the fuel vapor passing through said fuel vapor inlet tract.

4,026,258

CONTROL DEVICE FOR REGULATING THE AMOUNT OF COLLECTED FUEL AND/OR OIL VAPORS WHICH ARE DELIVERED TO THE COMBUSTION CHAMBER OF AN INTERNAL COMBUSTION

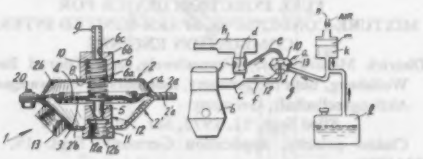
Takao Ino; Takeo Shimizu, and Hiroaki Ono, all of Kyoto, Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Japan

Continuation of Ser. No. 399,191, Sept. 20, 1973, abandoned, which is a continuation of Ser. No. 198,778, Nov. 15, 1971, abandoned, which is a continuation of Ser. No. 6,173, Jan. 27, 1970, abandoned. This application Feb. 24, 1975, Ser. No. 552,218

Claims priority, application Japan, Feb. 10, 1969, 44-9258

Int. Cl.² F02M *59/00*

U.S. Cl. 123—136 **3 Claims**



1. An apparatus for regulating the dissipation by evaporation of fuel for an internal combustion engine, of the type including an enclosure connected to the engine fuel tank and containing an absorbent medium effective to absorb evaporating fuel and means for admitting air, at substantially atmospheric pressure, to the enclosure to purge the medium of evaporated fuel, improved purge control means, for directing a flow of purge air admixed with evaporated fuel to the intake manifold of an internal combustion engine having a fresh fuel-air mixture supplied thereto through a carburetor including a venturi section and a throttle valve between the venturi section and the intake manifold, said purge control means comprising, in combination, a purge control valve including a casing and a flexible diaphragm dividing said casing into first and second chambers, means connecting said first chamber directly to only said venturi section for applying only the negative pressure of said venturi section, due to opening of said throttle valve and running of said engine, to a first surface of said diaphragm exposed to the pressure in said first chamber; a purge air inlet in said second chamber; conduit means engaged in said purge air inlet and directly connected to said enclosure for supply of purge air admixed with evaporated fuel to said second chamber; an outlet in said second chamber; means directly connecting said outlet to said intake-manifold downstream of said throttle valve in the direction of flow from said carburetor to said intake manifold, said outlet being formed as a venturi section defining an apertured valve seat; and a valve element in said second chamber connected fixedly to said diaphragm for conjoint movement therewith with respect to said apertured valve seat to control the flow area through said valve seat to control flow from said purge air inlet past said valve element through said outlet to said intake manifold in accordance with displacement of said diaphragm conjointly with said valve element; whereby said first surface of said diaphragm, in said first chamber, is subjected to the negative pressure of said carburetor venturi section effective in said first chamber, and a second surface of said disphragm, in said second chamber, is subjected to substantially atmospheric pressure, effective in said second chamber through said purge air inlet, as varied by the negative pressure in said intake manifold, effective in said second chamber through said outlet during running of said engine, so that, responsive to the negative pressure in said carburetor venturi section, upon starting of the engine with the pressure in said second chamber being substantially atmospheric, said valve element is moved in an opening direction and, during running of the engine, with the negative pressure of said carburetor venturi section remaining constant, said valve element is moved in a

throttling direction with respect to said apertured valve seat responsive to an increase in the negative pressure in said intake manifold reducing the effective positive pressure in said second chamber, and, with the negative pressure in said intake manifold remaining constant, said valve element is moved in an opening direction with respect to said apertured valve seat responsive to an increase in the negative pressure in said intake manifold due to increase in the opening of said throttle valve; whereby the flow rate of the purge air past said valve element through said outlet directly to said intake manifold, during running of the engine, is maintained proportional to the opening of said throttle valve and thus to the flow rate of fresh fuel and intake air through said carburetor.

4,026,259

FUEL INJECTION DEVICE FOR MIXTURE-CONDENSING, SPARK-IGNITED INTERNAL COMBUSTION ENGINES

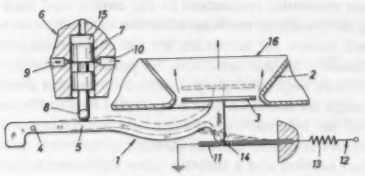
Dietrich Meyerdierks, Braunschweig, and Konrad Barnert, Wolfsburg, both of Germany, assignors to Volkswagenwerk Aktiengesellschaft, Germany

Filed Sept. 12, 1975, Ser. No. 612,714

Claims priority, application Germany, Sept. 19, 1974, 2244800

Int. Cl.² F02M *1/12, 1/10*

U.S. Cl. 123—139 AW **7 Claims**



1. In a mixture-condensing, spark-ignited internal combustion engine having an intake conduit, a fuel injection device for continuously injecting fuel into the intake conduit, measuring means located in the intake conduit and capable of being displaced, against a restoring force biasing the measuring means into a rest position assumed only during idling of the engine, according to the volume of air flowing through the intake conduit, and fuel proportioning means, regulated by the measuring means, for regulating the amount of fuel injected into the intake conduit, the improvement comprising stop means temporarily engageable with the measuring means to define the rest position thereof, the stop means being adjustable as a function of engine temperature for regulating the amount of fuel injected into the intake conduit as a function of temperature only during idling of the engine.

4,026,260

SPEED SENSITIVE FUEL CONTROL SYSTEM

Karl L. Kleimenhagen, and Mark F. Sommars, both of Peoria, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Aug. 4, 1975, Ser. No. 601,762

Int. Cl.² F02D *1/04*

U.S. Cl. 123—140 R **8 Claims**

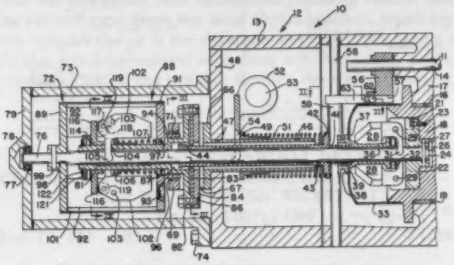
1. A speed sensitive fuel control system for an internal combustion engine, comprising;

a fuel control member for controlling the flow of fuel to the engine;

a speed responsive governor having an element operatively connected to the fuel control member and being of a construction sufficient for urging the fuel control member in a direction for increased fuel flow when the load on the engine is increased;

means for limiting movement of the fuel control member toward the increased fuel flow direction establishing a maximum fuel flow position of the fuel control member; and

a separate flyweight assembly connected to said element of the governor and being of a construction sufficient for



moving the element and the fuel control member in an opposite direction away from said maximum fuel flow position for decreasing fuel flow to the engine in response to the engine speed decreasing below a predetermined speed in response to a load thereon.

4,026,261

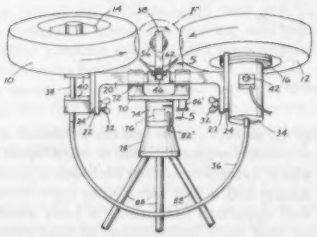
COACTING WHEELS TYPE FOOTBALL THROWING DEVICE

John K. Paulson, Lake Oswego; Walter J. Steffan, Portland, and Tommy L. Smith, Tualatin, all of Oreg., assignors to Jo Paul Industries, Inc., Tualatin, Oreg.

Filed Mar. 6, 1975, Ser. No. 556,013

Int. Cl.² F41B *11/00*

U.S. Cl. 124—78 **11 Claims**



1. A football throwing device, comprising:

a. only one pair of movable members providing a pair of mutually confronting football gripping surfaces spaced apart laterally a distance slightly less than the maximum diameter of a football,

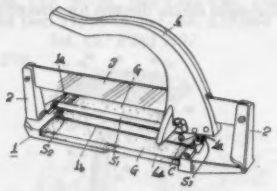
b. drive means engaging the movable members for moving said confronting surfaces simultaneously and at the same rate of speed in a forward, football projecting direction, and

c. rotary means mounting the pair of movable members for said forward movement of said confronting surfaces in planes which cut through the movable members perpendicular to the axes of rotation of the rotary means and which planes form between them an included acute angle selected to effect projection of a football with a predetermined rotation.

4,026,262
TILE CUTTER

Masaki Yasuga, 21-Go, 15-Ban, Minami 3-chome, Oimazato, Higashinari, Osaka, Japan

Filed Aug. 22, 1975, Ser. No. 606,949
Claims priority, application Japan, Oct. 2, 1974, 49-114171
Int. Cl.² B28D 1/32
U.S. Cl. 125—23 T 4 Claims



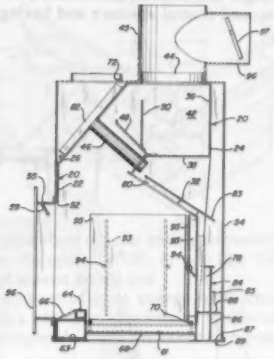
1. A tile cutter for cutting tile placed thereon, comprising:
a base;
a guide rod above and parallel to said base;
prop means extending upward from said base for supporting said guide rod above said base,
cushion means supported on said base beneath said guide rod for supporting thereon and cushioning said tile to be cut on both sides of the cut; and
cutter means slidably mounted on said guide rod for marking and cutting tile supported on said cushion means, said cutter means comprised of:
a bow shaped handle means having an opening therethrough slidably and pivotally fitted to said guide rod through said opening for sliding back and forth along said guide rod and pivoting downward against a tile on said cushion means to break said tile, said handle means further having outward and downward sloping fins on both sides thereof on either side of said guide rod which press against said tile when said handle means is forced downward,
adjustable sliding plate means mounted in said opening in said handle means and biased slightly toward said guide rod for enabling said handle means to slide freely along said guide rod,
a disc-type cutter having pivotably mounted support means within said opening and rotatable downward from said opening against said tile on said cushion means for cutting said tile when said handle means is moved back and forth along said guide rod,
cam means rotatably mounted to said handle means within said opening and abutting said support means for rotating against said support means and adjusting the downward projection of said cutter beneath said handle means, and
bearing means mounted to said handle means within said opening beneath said guide rod for easing the sliding motion of said handle means along said guide means and for providing a fulcrum when said handle means is forced downward to break said tile.

4,026,263
FIREPLACE SYSTEMS

Charles M. Boyd, P.O. Box 634, Fort Collins, Colo. 80522

Filed Jan. 2, 1976, Ser. No. 646,251
Int. Cl.² F24B 7/02, 7/04
U.S. Cl. 126—121 35 Claims

1. A fireplace system installed within an enclosure and comprising:
a firebox of heat-conductive material for confining the region of combustion of burnable products;
means defining an opening in the front of said firebox for enabling the insertion into said firebox of burnable products to be consumed;
an exhaust outlet for the egress of combustion products from said firebox;
a heat-exchange system in heat-transfer relationship with said firebox;
an air supply capable of feeding air from without said enclosure;
a circultion system for conducting air through said heat-exchange system and in communication to and from said enclosure;



control means for governing the conveyance of air from said supply to at least one of said firebox and said circulation system;
thermostat means within said enclosure for enabling and disabling said control means in response to temperature change within said enclosure;
and means, including a selectively openable closure for said opening, for at least essentially completely separating the flow of air in said circulation system from the flow of combustion air into said firebox and the egress of combustion products from said firebox.

4,026,264
PORTABLE FIREPLACE HEATING UNIT

Joseph Henriques, 32 Hidden Brook Drive, Brookfield, Conn. 06804

Continuation-in-part of Ser. No. 468,024, May 8, 1974, abandoned. This application Dec. 9, 1974, Ser. No. 530,981
Int. Cl.² F24B 7/02
U.S. Cl. 126—123 10 Claims

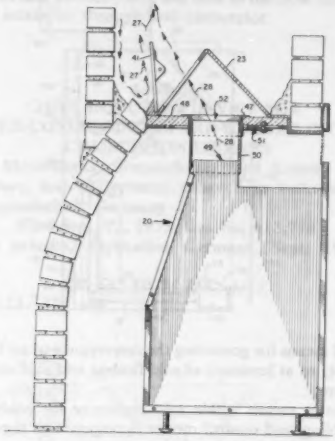
1. A portable heating device for use in a standard fireplace opening in conjunction with an aperture permanent damper frame of said standard fireplace, the original fireplace damper plate opened to its furthest upstanding position with the remaining portion of the original fireplace damper assembly disconnected from said original fireplace damper plate, said heating device comprising:
A. housing means, a portion of which forms a heating chamber having an apertured region in the upper portion of said heating chamber, said housing means incorporating means for positioning the housing within the standard fireplace opening inwardly spaced from the masonry wall thereof, said housing further incorporating an openable front portion communicating with the heating chamber for placement of fuel therein;
B. a closeable damper assembly movably mounted in said upper apertured portion of the heating chamber for connecting the heating chamber to the fireplace flue, said damper assembly incorporating,
1. an adapter plate dimensioned to cover and block a pre-existing damper opening in said permanent damper frame having a central aperture formed therein;
2. an aperture adapter assembly dimensioned to cover

and block a portion of the central aperture of the adapter plate, comprising:

a. an aperture adapter frame dimensioned to contact a portion of the adapter plate, having an aperture substantially equal to and aligned with the central aperture of the adapter plate; and

b. an aperture adapter plate positionably mountable to the aperture adapter frame generating a second central aperture;

3. a damper flue conduit dimensioned to extend through aid second central aperture and having:



a. lower entrance portal juxtaposed to the apertured region in the upper portion of the heating chamber and

b. an upper exit portal opening into the fireplace flue;

4. a damper plate movably mounted to said housing means at the upper portion of said housing means; and

5. means for manually positioning said damper plate; and

C. means for admitting air into the heating chamber;

whereby an air convection space is created between the outer portion of the enclosed heating chamber and the masonry fireplace wall so that air entering the convection space is circulated back past the housing and outside the fireplace for space heating purposes.

4,026,265

CHARCOAL BURNER

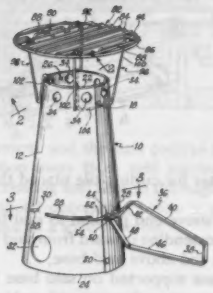
Giorgio I. Spadaro, 221 Princeton Av-SE, Albuquerque, N. Mex. 87106

Filed June 11, 1975, Ser. No. 585,844

Int. Cl.² F23Q *13/04*

U.S. Cl. 126—25 B **6 Claims**

1. In a portable charcoal igniting and burning stove of the type including an elongated sheet metal body constructed to define a generally frusto-conical upright flue that provides a constructed opening at the upper end thereof, a grate within the flue lying in a plane transverse to the longitudinal axis of said body and at a position spaced intermediate the upper and lower ends thereof to define a space below the grate in which combustion of readily ignitable material may be initiated and a space above the grate in which igniting of charcoal is to take place, aperture means in the side walls of the flue below the grate through which material below the grate may be ignited and through which air is drawn by the upward draft through the flue, and handle means for carrying the flue and for manipulating the flue, to dump ignited charcoal therefrom through said constricted opening, the improvement comprising, in combination: the flue having mounting aperture means in the walls thereof in a plane transverse to the longitudinal axis of the flue and adjacent the position at which the grate is to be located, the handle means including a pair of mounting members separate from the flue and constructed for cooperation with portions of the flue adjacent said mounting aperture means for both selectively securing the handle means to the flue and for providing within the flue a pair of spaced grate support members, a removable grate, of a size and area greater than the dimension and area of the constricted opening at the upper end of the flue, mounted within the flue to support thereon charcoal that is to be ignited, and the grate having securement means thereon for effecting selective manual securement of the grate to the pair of grate support members to suspend the grate within the flue from said grate support members, the grate being generally circular and the securement means comprising a pair of spaced segments on the grate offset upwardly from the plane of the remainder of the grate, so that upon pivoting of the grate about its center in the generally horizontal plane of said grate support members, said support members become embraced between said segmentsand the remainder of the grate to provide a selectively separable connection therebetween.



4,026,266

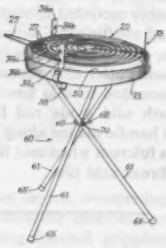
PORTABLE BARBECUE

Robert L. Cremer, Neosho, Mo., assignor to Neosho Products Company, Neosho, Mo.

Filed June 1, 1976, Ser. No. 691,754

Int. Cl.² F24B *3/00;* **F24C** *1/16, 15/08*

U.S. Cl. 126—25 A **9 Claims**



1. A portable barbecue comprising a bowl, a grid, legs for supporting said bowl, brackets for adjustably supporting said grid, said legs and said brackets being removably attachable to said bowl, said bowl having a bottom and substantially vertical sides upwardly extending from said bottom, a plurality of horizontally extending slots formed in said sides at peripherally spaced intervals, said brackets being formed from an elongated resilient strip of metal, each of said brackets having a notched portion containing a plurality of notches, a top notch adjacent one end of each of said strips, at least one additional notch below said top notch, each of said strips

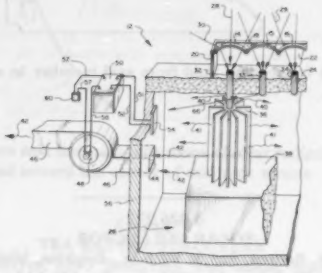
being insertable through one of said plurality of slots and each of said strips being formed so as to provide biasing means, said biasing means urging said notched portion of each of said strips into substantially vertical alignment with said sides and the other end of each of said strips into engagement with said bottom of said bowl.

4,026,267

SOLAR ENERGY APPARATUS

Rich F. Coleman, 117 "P" St., Salt Lake City, Utah 84103

Filed Dec. 11, 1975, Ser. No. 639,664
Int. Cl.² F24J *3/02*
U.S. Cl. 126—270 **5 Claims**



1. A solar energy apparatus comprising:

transmitting means and lens means for focusing solar energy on the transmitting means, said transmitting means comprising a plurality of optical fiber waveguides incorporated into a plurality of optical fiber bundles, at least a first optical fiber bundle accommodating absorption of solar energy as thermal energy, a radiating fins means attached to the first optical fiber bundle for radiating the thermal energy from the first optical fiber bundle, at least a second optical fiber bundle accommodating transmission of the solar energy; and

utilization means comprising a heat sink means and means for circulating heat from the heat sink means, the heat sink means comprising a heat storage enclosure and a heat sink in the heat storage enclosure, the means for circulating heat from the heat sink means comprising a duct means communicating with the heat storage enclosure, an electric motor, a blower in the duct means, the blower driven by the electric motor, a storage battery for operating the electric motor, a switch means supplying electrical energy from the storage battery to the electric motor, and a photoelectric cell means inside the heat storage enclosure for recharging the storage battery from solar energy transmitted by the second optical fiber bundle.

4,026,268

SOLAR ENERGY COLLECTOR

Donald M. Bartos, and Cedric G. Currin, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Sept. 29, 1975, Ser. No. 617,551
Int. Cl.² F24J *3/02*
U.S. Cl. 126—270 **4 Claims**

1. A solar energy collector comprising

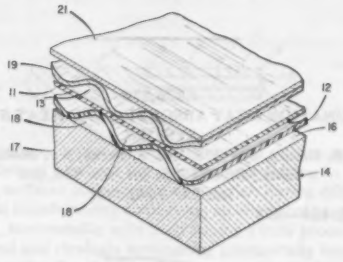
a first flat flexible sheet of pigmented silicone material,

a first sinuous sheet of glass fiber reinforced silicone material sealingly adhered to said first flat sheet along a plurality of spaced substantially parallel lines to provide therewith a series of substantially parallel ducts to carry a liquid heat transfer medium,

a liquid heat transfer medium in said ducts for carrying heat away from said collector to a place of utilization,

a flexible backing member adhered to the bottoms of said ducts thereby forming a plurality of substantially parallel air channels under said ducts, said backing member including a sheet of reflective foil for reflecting radiation toward the ducts and a layer of foam insulation below the foil; and

a solar energy transmitting thermally insulating window adhered to said first flat sheet, said window comprising



a second sinuous sheet of solar energy transmitting material adhered to the upper surface of said first flat sheet at a plurality of spaced points and

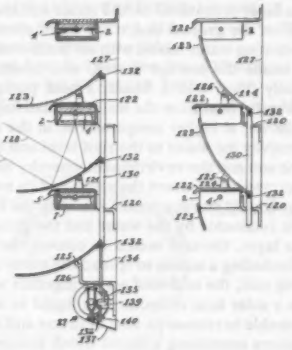
a second flat sheet of solar energy transmitting material adhered at a plurality of points to said second sinuous sheet to completely cover the other elements of the collector.

4,026,269

SOLAR HEATING SYSTEMS

William Stelzer, 1354 Blue Heron Drive, Milford, Mich. 48042

Filed Sept. 22, 1975, Ser. No. 615,430
Int. Cl.² F24J *3/02*
U.S. Cl. 126—270 **1 Claim**



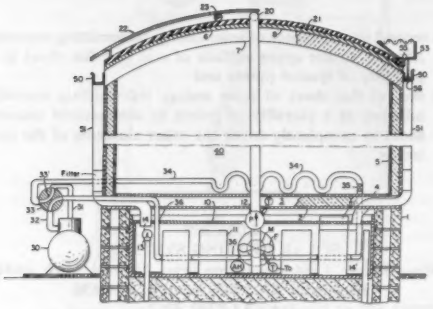
1. A solar heating system for converting solar radiation into heat, comprising an elongated horizontally disposed level heat absorbtive element extending east and west having a horizontally level underside at right angle to the force of gravity, said underside being adapted for good solar radiation absorbitvity, a horizontally level transparent pane underneath said heat absorbtive element, a space between said underside and said pane to contain a level layer of dead air, an insulating housing to cover said heat absorbtive element and having side walls supporting said transparent pane and confining said layer of dead air, reflector means having a reflective surface below said heat absorbtive element and said pane arranged at such angle as to receive solar radiation and to reflect it through said pane to said underside of said heat absorbtive element to convert said radiation into heat, said reflector means (and) being movable and adjustable by adjusting means to focus the

solar radiation reflected by said reflector means onto said horizontally disposed heat absortive element when in the operative position, (and) means to controllably render said reflector means ineffective by tilting said reflector means towards said housing so that said reflecture surface and said heat absorbtive element are not exposed to the sun and are shielded from adverse weather by said housing, and means to conduct the heat absorbed by said element away to be used.

4,026,270
COMBINATION HEAT ABSORBER AND HEAT STORAGE SYSTEM

Harry B. Ramey, Box 272, Rte. 5, Berea, Ky. 40403

Filed Jan. 6, 1975, Ser. No. 538,586
Int. Cl.² F24J 3/02
U.S. Cl. 126—271 **2 Claims**



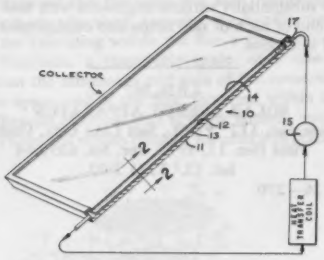
1. A dwelling unit having a roof, outer walls, and a foundation supporting the outer walls, a storage means comprising an impervious layer of material on the inside surface of the foundation and on the ground inside the foundation,said storage means containing water mixed with an antifreeze, at least one container inside the storage means, said container being at least partially filled with a liquid, a heat pump including a means to transfer heat from the water at relatively low temperatures to the air, at higher temperatures, in the dwelling unit, means to convey the water to the roof level and to expose said water to the sun and the environment whereby heat is restored to the water, means to return the water and its newly acquired heat energy to said storage means whereby the heat energy in the water is retainable by the water and the ground under the impervious layer, the said means to convey the water to the roof level including a means to spread the water on the roof of the dwelling unit, the said roof acting together with the water thereon as a solar heat collector, the liquid in said container being freezeable to release its heat of fusion and at least one of said containers containing a liquid which freezes at or below 32° F.

4,026,271
SOLAR COLLECTOR COATING

Ference J. Schmidt, Ardmore, Pa., assignor to Ametek, Inc., Paoli, Pa.

Filed May 19, 1976, Ser. No. 687,689
Int. Cl.² F24J 3/02; F28F 21/00
U.S. Cl. 126—271 **6 Claims**

1. A solar energy collector system comprising a heat transfer member, a first electrodeposited coating from a tartrate-containing bath of semiconductor PbO_2 on said member, a second electrodeposited coating of semiconductor oxygen-deficient PbO_2 having a high α and low ϵ on said first coating, means feeding fluid into heat transfer relation to said member,

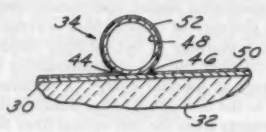


and means for feeding fluid from said member to a zone of utilization.

4,026,272
SOLAR COLLECTOR

Edward W. Bottum, 525 N. Fifth St., Brighton, Mich. 48116

Filed June 13, 1975, Ser. No. 586,612
Int. Cl.² F24J 3/02
U.S. Cl. 126—271 **5 Claims**



1. A solar collector comprising a housing, a steel plate within the housing to absorb sun rays and convert such rays to heat energy, steel tubing secured to the plate for conduction of heat energy from the plate to the tubing, said tubing being adapted for the flow of fluid therethrough to transfer heat energy from the solar collector to a point of use, a copper bond brazed in an inert atmosphere between said tubing and the plate forming both a mechanical bond and a heat conducting medium, and transparent plate means on the housing to permit sun rays to impinge upon the steel plate.

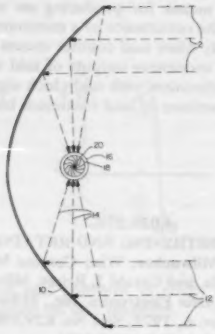
4,026,273
SOLAR FLUID HEATER WITH ELECTROMAGNETIC RADIATION TRAP

Blaine Frank Parker, Lexington, Ky., assignor to University of Kentucky Research Foundation, Lexington, Ky.

Filed Mar. 8, 1976, Ser. No. 664,627
Int. Cl.² F24J 3/02
U.S. Cl. 126—271 **15 Claims**

1. A solar fluid heater comprising:
pipe means for conveying a working fluid to be heated, said pipe means being transparent to solar radiation;
means for focusing solar radiation onto said pipe means; and
radiation trap means within said pipe means for trapping and absorbing solar radiation incident on said pipe means and creating multiple internal reflections of said solar radiation within said pipe means, said radiation trap means including a plurality of spaced fins extending transversely and longitudinally of said pipe means, said fins

having reflective surfaces and being so shaped as to create said multiple internal reflections of solar radiation



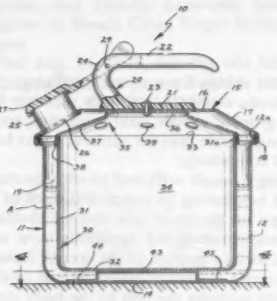
between said fins, said reflections of solar radiation being directed toward the center of said pipe means.

4,026,274

TEA KETTLE STRUCTURE

Julian Gutierrez, 6233 Brookview Ave. South, Minneapolis, Minn. 55424

Filed Dec. 12, 1974, Ser. No. 532,207
Int. Cl.² A47J 27/21
U.S. Cl. 126—390 **3 Claims**



1. A tea kettle structure, having in combination
an enclosed outer housing having a top, a bottom and an annular side wall,
an inner housing having a chamber therein and being disposed within said outer housing and having a top, a bottom and an annular side wall,
means securing said top wall of said inner housing with said top wall of said outer housing,
said inner and outer housings, save for the engagement of their top wall portions, being in closely spaced relation forming a chamber therebetween,
an upset portion engaging said bottom walls of said inner and outer housing transferring heat to said bottom wall of said inner housing,
said inner housing having imperforate side and bottom walls,
said top wall of said inner housing having spaced apertures therein
whereby water in said chamber between said housings is heated through the bottom and side walls of said outer housing and by the bottom and side walls of said inner housing by heat transferred thereto through said upset portion, and
a spout projecting from said outer housing communicating with said chamber between said housings.

4,026,275

CUTANEOUS SENSITIVITY DIAGNOSTIC DEVICE

Charles K. Jablecki, 1422 Damon Court SE., Rochester, Minn. 55901

Filed Oct. 30, 1975, Ser. No. 627,072
Int. Cl.² A61B 5/00
U.S. Cl. 128—2 N **11 Claims**

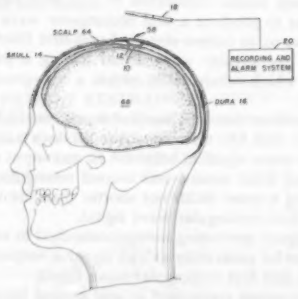
1. A diagnostic device for determining the cutaneous sensory reception of a patient by alternatingly applying to a patient's skin, surfaces of the device of materials having different rates of heat transferability comprising an elongated manually manipulate, non-metallic solid body having a bore proceeding from one end and closingly terminating substantially intermediate the length of said body and hence spacedly from the opposite end of said body, a metallic component having a stem portion non-adjustably, fittedly received within said bore and having an integral head of relatively greater cross-section than said stem projecting outwardly of said body one end, said head having an inner surface directed coveringly toward the adjacent end surface of said non-metallic body surrounding the adjacent end of said bore, said head further having a continuous unbroken outer surface defining a first skin applicable surface, said body opposite, integral end being of substantially like area as said metallic component head and having its outer surface defining a second skin applicable surface, the metallic component having a relatively high heat transferability with respect to said non-metallic body.

4,026,276

INTRACRANIAL PRESSURE MONITOR

John G. Chubbuck, Silver Spring, Md., assignor to The Johns Hopkins University, Baltimore, Md.

Filed Apr. 5, 1976, Ser. No. 673,970
Int. Cl.² A61B 5/02
U.S. Cl. 128—2 P **35 Claims**



1. Apparatus for sensing pressure within a cavity in the body of a living entity, comprising:
means deformable in response to pressure within the cavity, said means comprising
a housing formed of non-porous and electrically non-conductive material, the housing defining a chamber,
a predetermined mass of fluid disposed within the chamber, and,
pressure responsive means carried on the housing and extending into the chamber, said pressure responsive means being formed of non-porous and elastically compliant material and being deformable by pressure

imposed on the apparatus to change the volume occupied by the mass of fluid within the chamber; and

circuit means for absorbing electromagnetic radiation imposed thereon from externally of the circuit means at frequencies indicative of the deformation of the first-mentioned means.

4,026,277

BLOOD PRESSURE MEASURING APPARATUS

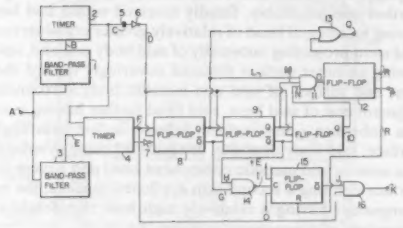
Atsushi Toda, Toyonaka; Yoshifumi Matsuoka, Yamatotakada, and Koichi Shigematsu, Kawanishi, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Apr. 7, 1975, Ser. No. 565,371

Claims priority, application Japan, Apr. 12, 1974, 49-41122; Apr. 12, 1974, 49-41123; Apr. 16, 1974, 49-43151; Apr. 18, 1974, 49-44073; Apr. 18, 1974, 49-44075; Apr. 18, 1974, 49-44288[U]

Int. Cl.² A61B *5/02*

U.S. Cl. 128—2.05 A **8 Claims**



1. A blood pressure measuring apparatus wherein the Korotkoff sounds are detected by a microphone in association with a pump and a cuff, and the Korotkoff sounds are utilized to indicate maximum and minimum blood pressures, said apparatus comprising:

first band-pass filter means connected to said microphone to pass frequency components of sphygmus sounds;

second band-pass filter means connected to said microphone to pass frequency components of the Korotkoff sounds;

first timer means connected to said first band-pass filter means to produce a first rectangular wave signal in response to an output signal of said first filter means, said firsst rectangular wave signal having a predetermined time which substantially covers a sphygmus wave duration;

second timer means connected to said second filter means and to said first timer means to produce a second rectangular wave signal in response to an output signal of said second filter means, said second retangular wave signal having a timer width not shorter than the time width of said first rectangular wave signal;

clock signal generating means connected to said first timer means for generating a clock signal in response to a fall of each said first rectangular wave signal;

counter means connected to said second timer means and said clock signal generating means for reading the presence or absence of said second rectangular wave signal and for storing said second rectangular wave signal sequentially in accordance with said clock signal; and

event determining means connected to said counter means for determining the occurrence of the maximum and minimum blood pressure events and for producing output signals representing the occurrence of said blood pressure events, said event determining means including:

maximum blood pressure determining means coupled to said counter means for producing an output signal representing the occurrence of a maximum blood pressure event only after said counter has counted at least two successive outputs of said second timer means in synchronism with said clock signal, and

mimimum blood pressure determining means coupled to said counter means for producing an output signal representing the occurrence of a minimum blood pressure event only when said counter means has counted less than two successive outputs of said second timer means in synchronism with said clock signal and only after the occurrence of said maximum blood pressure event.

4,026,278

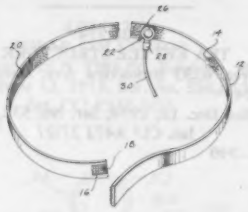
ELECTRODE POSITIONING AND RETAINING BELT

James R. Ricketts, Milwaukee, Wis.; Corrine M. Ballantine, Burlington, Canada, and Gerald J. Reiser, Milwaukee, Wis., assignors to Marquette Electronics, Inc., Milwaukee, Wis.

Filed Nov. 6, 1975, Ser. No. 629,596

Int. Cl.² A61B *5/04*

U.S. Cl. 128—2.06 E **3 Claims**



1. Apparatus suitble for removably affixing electrocardiographic electrode elements to a body member for providing electrocardiographic signals, said apparatus employing first and second engageable fastener surfaces of the hook and loop pile type and comprising:

a belt having a length sufficient to encircle the body member, said belt having an exposed surface of the first fastener type on the inner side thereof abuttable with the body member when the apparatus is in use, said belt having a surface portion of the second fasterner type on the outer said thereof adjacent an end of the outer side removably securing the belt to the body member by engaging the first fastener type surface with the second fastener type surface; and

a plurality of electrode elements, each of the electrode elements including a surface of the second fastener type electrode elements being thereon, each of the removable thereon attached by the second fastener type thereon, each of the electrode elements being removably attached by the second fastener type surface thereon at a desired location on the exposed surface of the inner side of said belt, said electrode elements including means for connection to electrocardiographic signal responsive equipment.

4,026,279

MASSAGING APPARATUS

Luther G. Simjian, 7 Laurel Lane, Greenwich, Conn. 06830

Filed May 10, 1976, Ser. No. 684,473

Int. Cl.² A61H *7/00*

U.S. Cl. 128—44 **17 Claims**

1. A massaging apparatus comprising:

a stationary support;

a rotatable platform supported on said support;

a massaging means positioned to engage a body portion of a person disposed upon said platform, and

means coupling said massaging means to said platform for causing said massaging means to move responsive to

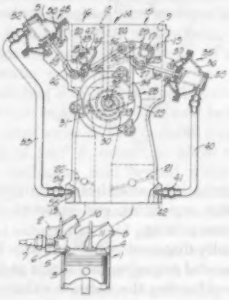
rotation of said platform to effect a massaging action upon a person on said platform.

4,026,280

CHOKE CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINE

Masahiko Iiyama, and Takashi Kamezaki, both of Tokyo, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 14, 1975, Ser. No. 604,886
Claims priority, application Japan, Aug. 15, 1974, 49-92809
Int. Cl.² F02M *25/06*
U.S. Cl. 123—119 F **9 Claims**



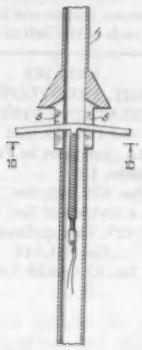
1. In a choke control system for starting an internal combustion spark ignition engine having an auxiliary combustion chamber in communication with each main combustion chamber and having spark ignition means for igniting a mixture in the auxiliary combustion chamber, the improvement comprising, in combination: a main carburetor for supplying a lean mixture to the main combustion chambers, an auxiliary carburetor for supplying a rich mixture to the auxiliary combustion chambers, a main choke valve in the intake passage of the main carburetor, an auxiliary choke valve in the intake passage of the auxiliary carburetor, a control element connected to actuate the main choke valve through a spring so that overtravel of said control element after the main choke valve is closed stores energy in the spring, means connected to said control element to move the auxiliary choke valve toward closed position only after such overtravel has closed the main choke valve.

4,026,281

METHOD AND APPARATUS FOR INSERTING AN INTRAUTERINE CONTRACEPTIVE DEVICE

Derral Mayberry, Somerset; Jawahar Sawardeker, Bound Brook, and John McShefferty, Somerville, all of N.J., assignors to Ortho Pharmaceutical Corporation, Raritan, N.J.

Filed Oct. 12, 1973, Ser. No. 405,960
Int. Cl.² A61F *5/46*
U.S. Cl. 128—130 **3 Claims**



1. A method of inserting an intrauterine contraceptive device which comprises:

providing a tubular sheath having an outer diameter sufficiently small to permit insertion into the uterus through the cervix, said tubular sheath having at least two opposed slots along its length,

introducing an intrauterine device into said tubular sheath through said opposed slots, said device being adapted to be within the fold of the uterine cavity,

introducing a tubular plunger into the bottom of said tubular sheath to a point sufficient to make contact with said device,

introducing said plunger, tubular sheath and the contained device through the cervix into the uterus,

expelling said device from said sheath by inserting the plunger deeper into said sheath, whereby said device is in exposed condition within the uterus, and

withdrawing said sheath.

4,026,282

PATIENT RESTRAINING GOWN

Lois Thomas, 1160 Chemawa Road NE., Salem, Oreg. 97303

Filed Oct. 20, 1975, Ser. No. 623,722
Int. Cl.² A61F *13/00*
U.S. Cl. 128—134 **6 Claims**

1. In a restraining gown,

a decorative gown portion having a front portion,

a belt attached at its central portion to the front portion of

the gown portion and confined to the sides of the gown portion,

means securing the end portions of the belt together in crossed-over positions and permitting sliding movement between the end portions at least sufficiently for a patient to turn without restraint from a position on her back to a position on her side, the securing means being a long, reinforced, longitudinal slit in one of the end portions through which the other end portion extends and can move laterally,

and a pair of connector means one on each end of the belt for securing the ends of the belt to sides of a bed or chair.

4,026,283

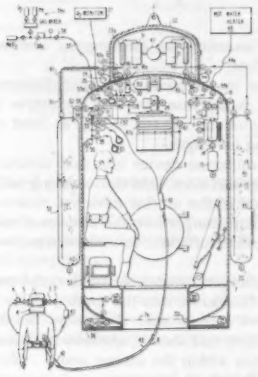
CLOSED CIRCUIT, FREE-FLOW UNDERWATER BREATHING SYSTEM

Mark P. Banjavich, New Orleans, and Anthony V. Gaudiano, Metairie, both of La., assignors to Taylor Diving & Salvage Co., Inc., Belle Chasse, La.

Division of Ser. No. 429,045, Dec. 28, 1973, Pat. No. 3,924,618, which is a division of Ser. No. 198,105, Nov. 12, 1971, Pat. No. 3,802,427. This application Nov. 14, 1975, Ser. No. 631,919

Int. Cl.² A62B *7/00*

U.S. Cl. 128—142.3 **2 Claims**



2. A closed circuit, free-flow, underwater breathing apparatus comprising:

a diving helmet means;

circulation path means passing through said diving helmet means and operable to continuously circulate breathable gas therethrough;

first pressure pulse generating and pressure pulse absorbing means located upstream of said diving helmet means and including

compressor pump means operable to generate increased pressure pulses in said circulation path means, with said increased pressure pulses urging said breathable gas toward said diving helmet means, and

first, pressure pulse absorbing, expansion chamber means operable to receive breathable gas subjected to said pressure pulses, as said breathable gas flows through said circulation path means from said compressor pump means enroute to said diving helmet means,

said first, pressure pulse absorbing, expansion chamber means having a relatively large volume operable to reduce pressure pulsations and permit a relatively steady flow of pressurized, breathable gas to said diving helmet means;

second pressure pulse generating and pressure pulse absorbing means located downstream of said diving helmet means and including depressor pump means operable to generate reduced pressure pulses in said circulation path means, with said reduced pressure pulses urging said gas away from said diving helmet means, and

second pressure pulse absorbing, expansion chamber means operable to receive gas subjected to said reduced pressure pulses, as said gas flows through said circulation path means from said diving helmet means enroute to said depressor means,

said second, pressure pulse absorbing, expansion chamber means having a relatively large volume operable to reduce pressure pulsations and permit a relatively steady flow of pressurized gas from said diving helmet means;

pressure responsive, regulating valve means operable to control said continuous circulation of breathable gas through said diving helmet means; and

said first and second, pressure pulse absorbing expansion chamber means defining

bifurcated, pressure pulse absorbing, expansion chamber means bracketing said diving helmet means and operable to reduce the magnitude of pressure pulsations in said circulation path means both upstream and downstream of said pressure responsive, regulating valve means.

4,026,284

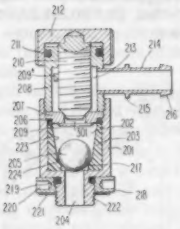
PRESSURE RELIEF VALVE FOR ANESTHETIC ADMINISTRATION

John R. Boehringer, 427 Parkview Drive, Wynnewood, Pa. 19096

Filed Aug. 29, 1975, Ser. No. 609,072

Int. Cl.² A61M *16/00*

U.S. Cl. 128—188 **6 Claims**



1. In a vacuum exhausted anesthesia administration system, valve apparatus for regulating gas pressure in the patient anesthesia circle comprising:

generally vertically disposed housing means having an inlet port at a lower end engaging said circle and an outlet port at an upper end feeding the vacuum exhaust, said housing means defining at least one cavity therein, communicating respectively with said inlet ports, said cavity having an opening of predetermined diameter at said inlet port and a generally frustoconical shape from said opening upwardly increasing in diameter toward said outlet port;

means for coupling said inlet port to said patient circle;

means for coupling said outlet port to said vacuum exhaust;

a ball freely movable movable within said cavity, said ball having a diameter larger than said predetermined diameter, said ball having predetermined specific gravity to provide continuous predetermined back pressure to gases at said inlet port; and

adjustably movable piston means having an end portion matable with said outlet port for sealable closure, said end portion of said piston means having at least two successive, differently inclined surfaces, one of said surfaces sealably mating with said outlet port and the other of said surfaces being configured to produce predeter-

mined variable occlusion of said outlet port in response to adjustment of said piston means.

4,026,285

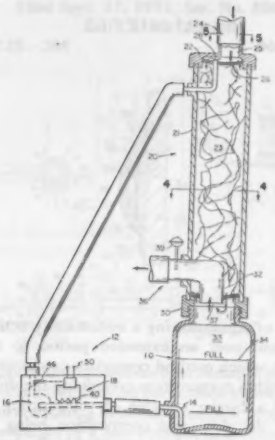
HUMIDIFIER FOR AIR TO BE INHALED

Richard R. Jackson, 8 Trinity Road, Marblehead, Mass. 01947

Continuation-in-part of Ser. No. 241,440, April 5, 1972, abandoned, which is a continuation of Ser. No. 854,427, Sept. 2, 1969, abandoned. This application June 2, 1975, Ser. No. 582,818

Int. Cl.[2] A61M *16/00*

U.S. Cl. 128—192 18 Claims



1. In a humidifier for use with a medical respirator or other gas source, comprising a water reservoir containing a main charge of water, a gas passage for conducting gas to be inhaled by a person, heater means to heat said water and means for gradually introducing said water into gas in said gas passage from whence it is inhaled by the person, the improvement including means for preventing growth of and reducing bacteria in said water comprising means for progressively and temporarily isolating a relatively small quantity of water from the charge of water in said reservoir, said heater means including a heater to heat water in said isolated quantity to a temperature in excess of 140° F, means to allow return of said isolated quantity including said heated water progressively to said main charge of water, and a thermostat energizing and de-energizing said heater means to maintain the temperature of the water introduced in said gas at a temperature substantially less than 140° F whereby said humidifier, during extended operation, can prevent growth of and reduce bacteria in said water reservoir without overheating of water entering said gas or the person breathing the thus humidified gas.

4,026,286

ISOLATORS

Philip Charles Trexler, Sindlesham, England, assignor to National Research Development Corporation, London, England

Filed May 25, 1976, Ser. No. 689,868

Claims priority, application United Kingdom, May 29, 1975, 23470/75

Int. Cl.[2] A61M *16/02*

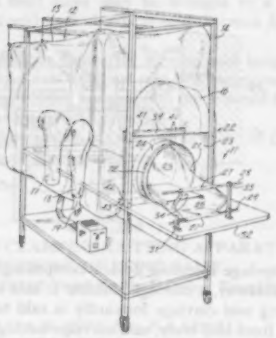
U.S. Cl. 128—204 15 Claims

1. An enclosure apparatus for providing an environment isolated from the ambient environment, said enclosure apparatus comprising;

an enclosure member for providing an environment isolated from the ambient environment and at a higher pressure than the ambient environment, said enclosure member having an opening for passage of objects into and out of the enclosure member;

a flexible sleeve, one end of said sleeve being coupled to the enclosure member around said opening and the other end of said sleeve being for positioning externally of the enclosure member; and

air permeable member means positioned across said opening in the enclosure member for passing a restricted substantially non-turbulent flow of air along the sleeve when the interior of the enclosure member is maintained at a higher pressure than the ambient environment, said air permeable member means being movable away from the opening in the enclosure member for passage of objects along the sleeve into and out of the enclosure member.



4,026,287

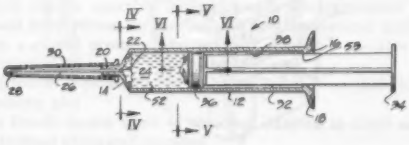
SYRINGE WITH RETRACTABLE CANNULA

Irene Haller, 718 Murdell Lane, Livermore, Calif. 94550

Filed Dec. 10, 1975, Ser. No. 639,264

Int. Cl.[2] A61M *5/16, 5/32*

U.S. Cl. 128—215 9 Claims

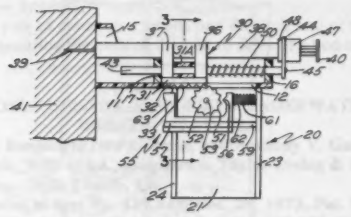


1. In a hypodermic syringe having a hollow barrel having an end wall closing said barrel at the forward end of said syringe, and an open rear end; a piston means in reciprocable sealing engagement with the interior of said barrel defining a chamber in said barrel for containing fluid; a cannula mounted on said end wall defining an interior passage; and an aperture in said end wall communicating said cannula interior passage with said chamber, the improvement which comprises means for rectracting said cannula entirely within said chamber subsequent to reciprocation of said piston means to discharge said fluid from said chamber so that accidental injury is avoided, said means for retracting comprising frangible means for enabling separation of said forward wall from said barrel, and engagement means for selectively attaching said piston means to said forward end wall whereby retracting of said piston means toward said rear end after attaching said piston means to said end wall causes breaking of said frangible means and the retraction of said cannula into said barrel.

4,026,288
SYRINGE INJECTING DEVICE

Roger Costa, Somerset, Mass., and Lawrence T. French, Jr., East Providence, R.I., assignors to Insulin Injector Inc., East Providence, R.I.

Filed Oct. 21, 1975, Ser. No. 624,337
Int. Cl.² A61M 5/20
U.S. Cl. 128—218 F 2 Claims

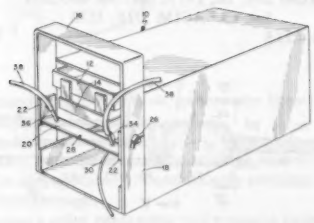


1. A syringe injecting device comprising a body provided with a slideway, a carriage slidable in said slideway, a spring for urging said carriage forwardly in said body, a handle extending from said body, said carriage having a rack extending from said slideway, means in said handle for controling the slidable movement of said carriage under influence of said spring, said means including a fingerpiece extending from said handle, a gear rotatably mounted in said handle and engaging said rack, and latch having a positive detent engaging said gear to lock it against rotation in either direction, said fingerpiece operating said latch, said latch being urged toward said gear by a spring, said carriage having means to carry a syringe.

4,026,289
VACCINATING AND BEAK-HOLDING ACCESSORY FOR A BIRD PROCESSOR

Edward M Hendrix, Rte. 2, Dentonville, Ark. 72712

Filed June 24, 1976, Ser. No. 699,266
Int. Cl.² A61D 7/00
U.S. Cl. 128—223 3 Claims



1. A bird treating apparatus comprising:

a. a frame having a forward end defining a pair of vertical sidewalls;

b. a rigid, hollow bar horizontally extended between said vertical sidewalls, and having a pair of vertical flanges, one being mounted at each end of said bar, said flanges being flush against and rigidly and removably mounted to said vertical sidewalls;

c. a cauterizing blade and means movably mounting same to said frome and parallel to and above to said bar, said blade being operable to descend against bar to trim an upper beak portion extended across said bar;

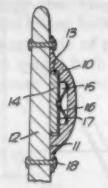
d. fluid inlet and outlet structure disposed at opposite ends of said bar and circulation means connected thereto to effect the flow of a cooling fluid through said bar;

e. said bar having an injection orifice in the front thereof and including a heat conductive tube entering said bar from the rear, passing through the hollow interior as a bar and terminating in communication with said orifice, whereby a supply of forced fluid solution applied to said tube can be injected into a bird's mouth while the upper beak member thereof is trimmed, the cooling fluid in the bar preventing undue injury to the bird and fluid in use.

4,026,290
METHOD OF ADMINISTERING MEDICAMENTS THROUGH THE SKIN

Peter John Brooker, and John Goose, both of Saffron Walden, England, assignors to Fisons Limited, England

Filed Nov. 18, 1975, Ser. No. 633,081
Claims priority, application United Kingdom, Nov. 30, 1974, 51941/74
Int. Cl.² A61F 7/02
U.S. Cl. 128—260 4 Claims

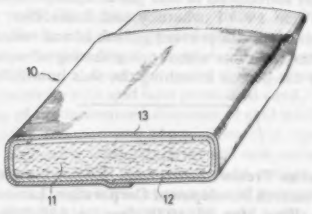


1. A method of administering a systemically active anthelmintic compound over an extended period to an animal through its skin, which method comprises contacting the skin of the animal with a composition containing the anthelmintic compound and a carrier capable of transmitting the compound through the skin, said composition being contained within one or more depressions provided in the basal surface area of a device having means by which it is attached to the animal such that the basal surface area thereof contacts the skin of the animal.

4,026,291
ARTICLE FOR TREATING SECRETING FLUID OF THE HUMAN BODY

Tadashi Nagano, 6-5-5, Hatanodai Shinagawa, Tokyo, and Nobuakira Fujinami, 2-9-21, Shonan-Takatori Yokosuka, Kanagawa, both of Japan

Filed May 16, 1975, Ser. No. 578,068
Claims priority, application Japan, May 25, 1974, 49-58922
Int. Cl.² D21D 3/00; A61F 13/16
U.S. Cl. 128—284 1 Claim



1. A compact article for treating secreting fluid of the human body comprising an absorbent core member made of a cationized cellulose fiber and containing nitrogen in an amount ranging from 0.5 to 10 percent, said fiber being a mixture of a fiber and an alkaline aqueous solution of cyanamide compounds, said core member being treated with an astringent or gelatinizing agent consisting of at least tannic acid, alum, ferric chloride, polyethylene oxide, polyacrylic acid soda and carboxymethyl cellulose;

an inner water-proofing member made of a cellulose fiber and partially covering said core member, said inner member preventing said secreting fluid from permeating to the backside of said article; and

an outer cover member made of cellulose or artificial fiber or a mixture of cellulose and artificial fibers and completely covering both said core and inner members.

4,026,292

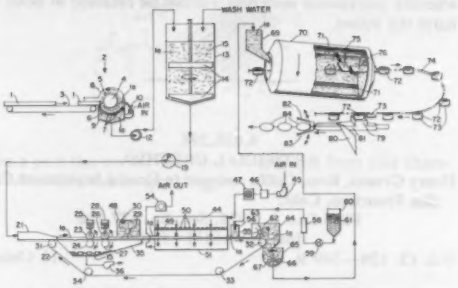
TAMPON HAVING A MENSESPHILIC FOAM TREATED WITH A LIQUID LUBRICANT

James P. Hutchins, Cincinnati, and Robert D. Dobson, Greenhills, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Sept. 17, 1974, Ser. No. 506,828

Int. Cl.² A61F *13/20*

U.S. Cl. 128—285 **4 Claims**



1. A tampon having an absorbent means wherein said absorbent means is a free-flowing particulate mensesphilic polyurethane foam containing between about 0.5 percent and about 5 percent by weight of a non-volatile, hydrophobic liquid lubricant, based on the air dry weight of said foam, said lubricant having a viscosity of between about 100 and about 400 centipoise as measured at a temperature of about 100° F, said particulate foam expanding upon being placed in a body cavity and before being wetted, said particulate foam exhibiting no significant dimensional changes due to moisture pick-up from the atmosphere after extended period of storage under high humidity conditions.

4,026,293

PHOTOCOAGULATOR

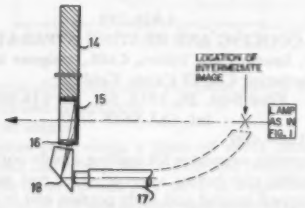
Erich Blaha, Wasseralfingen; Walter Lang, and Ortwin Mueller, both of Koenigsbronn, all of Germany, assignors to Carl Zeiss-Stiftung, Oberkochen, Germany

Filed May 16, 1975, Ser. No. 577,991

Claims priority, application Germany, May 21, 1974, 7417688[U]

Int. Cl.² A61F *9/00*

U.S. Cl. 128—303.1 **16 Claims**



1. A photocoagulator comprising

a. a gas discharge lamp elongated along a lamp axis and having a light output path along an optical axis approximately perpendicular to said lamp axis,

b. optical means in said light output path for forming an image of light from said lamp at a distance along said optical axis from said lamp,

c. a mirror arranged on said optical axis on the opposite side of said lamp from said optical means, for reflecting light from said lamp along said optical axis and through said optical means to form a second image at a distance,

d. a plurality of interchangeable field stops,

e. means for holding said field stops in position so that any one of said field stops may be brought to a position aligned with said optical axis at said distance from said lamp,

f. manually operable means for moving said lamp axially along said lamp axis to adjust said first mentioned image relative to said second image and to the selected field stop aligned with said optical axis, and

g. means for illuminating the side of the selected field stop which is remote from said lamp.

4,026,294

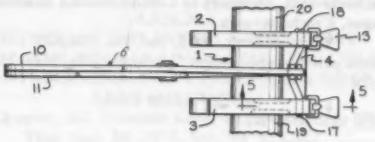
COMBINATION CLAMPING/CUTTING APPARATUS AND METHODS OF USING SAME

Martin Mattler, 24575 Franklin Park Drive, Franklin, Mich. 48025

Filed Oct. 8, 1975, Ser. No. 620,812

Int. Cl.² A61B *17/32, 17/08*

U.S. Cl. 128—305 **9 Claims**



1. An apparatus for clamping and severing an elongated member, comprising, in combination:

first means for clamping said elongated member;

second means for clamping said elongated member;

third means operably and mechanically interconnected to said first and second means for maintaining said first and second means in a predetermined side-by-side relationship; and

fourth means operably and releasably interconnected to said third means for moving said first and second means to a closed position wherein said elongated member is clamped by said first and second means;

said fourth means adapted to be removed from said third means; and

said fourth means when so removed adapted to sever said clamped elongated member.

4,026,295

SURGICAL KNIFE

David M. Lieberman, 9 Prospect Park West, Brooklyn, N.Y. 11215

Filed June 19, 1975, Ser. No. 588,287

Int. Cl.² A61B *17/32*; A61F *9/00*

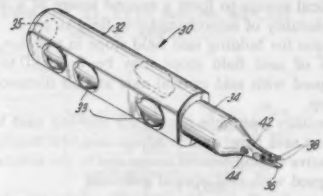
U.S. Cl. 128—305 **12 Claims**

1. A surgical knife comprising:

an elongated handle, one end of which is adapted to be manually gripped;

cutting means disposed at and axially aligned with the opposite end of said handle, said cutting means having upper and lower portions including a lower elongated arcuate shoe member projecting axially from said opposite end of the handle, a pair of upper spaced, elongated ski members also projecting axially from said opposite end of the

handle, said elongated ski members being generally arcuate in configuration to conform to the configuration of said shoe member, said elongated ski members being disposed above and spaced from said shoe member; and



an elongated generally upwardly facing cutting blade having a cutting edge and extending generally axially with and contacting said shoe member, said cutting blade extending intermediate said spaced ski members for a portion of their length whereby the cutting edge thereof is visible through the space intermediate the ski members.

4,026,296

HYDROPHILIC SURGICAL TUBULAR DEVICE

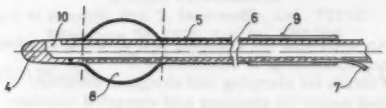
Artur Stoy; Vladimír Stoy, and Jiří Zíma, all of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

Filed Mar. 3, 1975, Ser. No. 554,625

Claims priority, application Czechoslovakia, Mar. 19, 1974, 1981/74

Int. Cl.² A61M *25/00*

U.S. Cl. 128—349 B **6 Claims**



1. A surgical tubular device to be introduced temporarily into cavities of a living body such as a catheter, intubation or sounding tube, cystoscope or the like, comprising an insertion end including a surface area extending therefrom consisting essentially of a hydrophilic polymer of acrylonitrile and a hydrophilic comonomer selected from the group consisting of acrylonitrile, acrylamide, acrylic acid, methacrylamide, methacrylic acid, ethylene sulphonic acid and their salts, said polymer being swelled with an aqueous liquid, and containing neutralized anionic groups making it highly slippery in contact with water, and an opposite end having a surface area extending backward therefrom to be exposed to the atmosphere during use being protected against drying by a layer of an elastic polymer or copolymer impermeable to water and water vapors.

4,026,297

INFANT'S TEETHER TOY

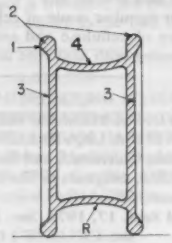
Keiji Kobayashi, P.O. Box 687, Pahoa, Hawaii 96778

Filed July 14, 1975, Ser. No. 595,879

Int. Cl.² A61J *17/00*

U.S. Cl. 128—359 **4 Claims**

1. An infant's teether toy comprising a flexible soft drum-shaped article having a generally flat recessed head and an integral outstanding rounded rim of greater diameter than the remainder of the drum-shaped article on each end to serve as teething rings and surfaces on which the article may be rolled wherein the external surfaces of the article are continuous



whereby extraneous materials will not be retained in holes to harm the infant.

4,026,298

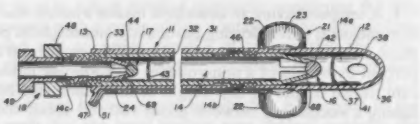
ARTIFICIAL URETHRA

Henry Grausz, Ross, Calif., assignor to Grausz Investment Co., San Francisco, Calif.

Filed Dec. 3, 1975, Ser. No. 637,120

Int. Cl.² A61M *15/00*

U.S. Cl. 128—349 R **11 Claims**



1. An elongate, tubular urethra catheter having an inner end and an outer end and adapted for positioning in the urethra canal of a user and having a passage therethrough for providing periodic bladder drainage periods;

individually manually operable closure means supported on the catheter in spaced upstream and downstream positions for occluding the passage through the catheter at said positions; and

means for sequentially operating the closure means to close the upstream closure means first and the downstream closure means second to provide a liquid and air seal in said passage at each of said positions and an air lock in said passage between said positions.

4,026,299

COOLING AND HEATING APPARATUS

James W. Sauder, San Ysidro, Calif., assignor to Vari-Temp Manufacturing Co., El Cajon, Calif.

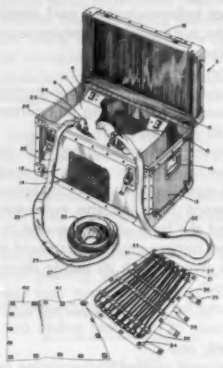
Filed Sept. 26, 1975, Ser. No. 616,909

Int. Cl.² A61F *7/00*

U.S. Cl. 128—400 **16 Claims**

1. A portable apparatus for cooling a body portion comprising a cooling unit having an evaporator pad and tubing for being wrapped around said body portion and in which vaporized refrigerant composition cools said pad, a compressor and a condenser for liquefying refrigerant composition, a fan for moving air for cooling said condenser, an auxiliary evaporator, conduits for directing refrigerant composition in said unit and to and from said pad and tubing for cooling thereof, and a carrying case for said unit comprising a lid, a bottom, front,

back and side panels cooperating to form a chamber in which said unit is received, wherein said front and back panels each



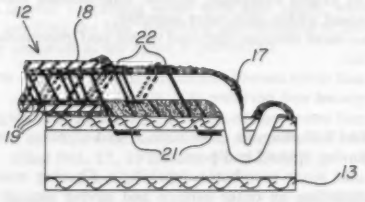
have a port therein for directing air into and from said chamber when said fan is operating.

4,026,300

METHOD AND APPARATUS FOR INTERFACING TO NERVES

Carlo J. DeLuca, Newton, and L. Donald Gilmore, Wellesly Hills, both of Mass., assignors to Liberty Mutual, Boston, Mass.

Filed Mar. 14, 1975, Ser. No. 558,472
Int. Cl.² A61N *1/04*
U.S. Cl. 128—418 **14 Claims**



1. An anatomically implantable electrical device for interfacing to nerves and comprising:

electrical lead means;

coupling means comprising a piece of sheet material secured to one end of said lead means and being shaped to encircle the outer surface of a nerve at a minimum spacing therefrom of 0.3 millimeters, said sheet material having interstices for accommodating vascular flow and receiving anatomic tissue growth after being implanted; and

input terminal means electrically connected to said one end of said lead means and supported by an inner side of said sheet material so as to contact the embraced nerve.

4,026,301

APPARATUS AND METHOD FOR OPTIMUM ELECTRODE PLACEMENT IN THE TREATMENT OF DISEASE SYNDROMES SUCH AS SPINAL CURVATURE

Harry G. Friedman, Plymouth, and Robert W. Wickham, Jr., Harris, both of Minn., assignors to Medtronic, Inc., Minneapolis, Minn.

Filed Apr. 21, 1975, Ser. No. 569,842
Int. Cl.² A61N *1/04*
U.S. Cl. 128—418 **19 Claims**

1. Apparatus for positioning and securing and electrode within paraspinal muscles for use in the electrical treatment of spinal curvature, said apparatus comprising;

sleeve means;

probe means inserted within said sleeve means, said probe means including blunt tip means extending from said sleeve means when said probe means is inserted therein for penetrating said muscle and means engaging said sleeve means for carrying said sleeve means with said probe means during said muscle penetration while allowing said probe means to be withdrawn from said sleeve means and said muscle after said penetration; and

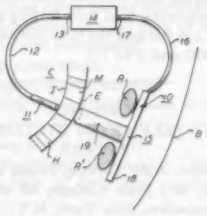
elongated means inserted within said sleeve means after withdrawal of said probe means, said elongated means including means engageable with said electrode for imparting a force thereto while allowing a disengagement with said electrode in one direction along the longitudinal axis of said elongated means.

4,026,302

METHOD OF IMPLANTING A PERMANENT PACEMAKER BIPOLAR LEAD APPARATUS AND AN IMPLANTABLE PERMANENT PACEMAKER BIPOLAR LEAD APPARATUS

Joseph Grayzel, 262 Fountain Road, Englewood, N.J. 07631

Filed Apr. 30, 1975, Ser. No. 573,042
Int. Cl.² A61N *1/04*
U.S. Cl. 128—418 **14 Claims**



4. An apparatus for applying a pacemaking signal across the heart muscle, comprising:

a. a first electrode connectable to a first pole of a pacemaker and positionable in a chamber of the heart muscle adjacent the inner surface thereof;

b. a second electrode connectable to the second pole of the pacemaker and positionable subcutaneously and through the intercostal muscle to a position adjacent the outer surface of the heart muscle so as to overlie the first electrode.

4,026,303

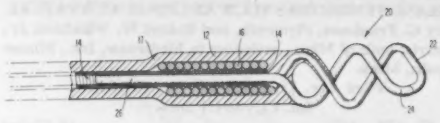
ENDOCARDIAL PACING ELECTRODE

Istvan F. Babotai, Greifensee, Switzerland, assignor to Vitatron Medical B.V., Dieren, Netherlands

Filed Nov. 17, 1975, Ser. No. 632,582
Int. Cl.² A61N *1/04*
U.S. Cl. 128—418 **13 Claims**

1. A pacing electrode adapted for insertion through a portion of a patient's cardiovascular system such that its distal

end is within the patient's heart, comprising a lead extending substantially the length of such electrode, and a contact tip element positioned at the distal end of said catheter and electrically connected to said lead, said tip element being of a closed spiral configuration having a rounded surface and presenting a plurality of open grooves.



4,026,304

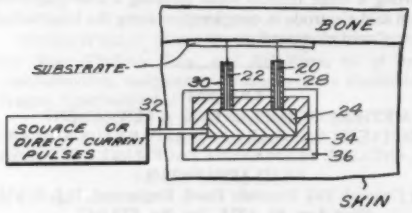
BONE GENERATING METHOD AND DEVICE

Didya D. Levy, Brooklyn, N.Y., assignor to Hydro Med Sciences Inc., New York, N.Y.

Continuation of Ser. No. 243,207, April 12, 1972, abandoned. This application Nov. 6, 1974, Ser. No. 521,407

Int. Cl.² A61N 1/36

U.S. Cl. 128—419 F **23 Claims**



1. A method of stimulating in vivo bone growth comprising the steps of generating a train of electrical pulses of a direct current and applying said train of electrical pulses to a bone within a living vertebrate, said train having a ratio between the time duration of a pulse and the time between adjacent pulses between 1 to 1000 and 1 to 10.

4,026,305

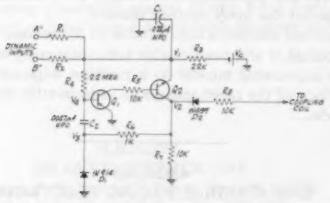
LOW CURRENT TELEMETRY SYSTEM FOR CARDIAC PACERS

Robert R. Brownlee, State College; Frank O. Tyers, Hershey, and Carl Volz, Sr., State College, all of Pa., assignors to Research Corporation, New York, N.Y.

Filed June 26, 1975, Ser. No. 590,414

Int. Cl.² A61N 1/36

U.S. Cl. 128—419 PT **9 Claims**



1. Apparatus for telemetering the condition of a component in a cardiac pacer implanted in a patient, which pacer provides stimulating pulses to the heart of the patient, comprising:

voltage means in said pacer for producing a voltage output signal indicative of the condition of a component of said pacer;

a ground;

pulse producing means in said pacer for receiving said voltage output signal and producing an output train of electrical pulses independent of said stimulating pulses, said pulse producing means comprising a complementary astable multivibrator comprising:

a first transistor; and

a second transistor of opposite conductivity type from said first transistor and having its emitter directly connected to said ground;

means in said pacer for modulating said output train of electrical pulses in accordance with the magnitude of said voltage output signal, said modulating means comprising:

a resistor inserted between the collector of said first transistor and the base of said second transistor; and

a diode inserted between the base of said second transistor and said ground with its anode directly connected to said ground;

means in said pacer for electrically transmitting said modulated output train of electrical pulses out of said pacer and said patient; and

means external to said patient for receiving said electrically transmitted output train of electrical pulses.

4,026,306

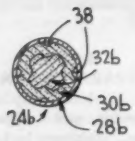
TOBACCO SMOKE FILTER

Richard M. Berger, Richmond, Va., assignor to American Filtrona Corporation, Richmond, Va.

Filed Nov. 6, 1975, Ser. No. 629,680

Int. Cl.² A24D 1/04

U.S. Cl. 131—10.5 **7 Claims**



1. A smoke filter means including a filter element comprising:

a. an axially elongated, hollow, outer member;

b. an axially elongated, hollow, intermediate member disposed within said outer member;

c. an inner member disposed within said intermediate member;

d. said outer member including an inner surface and having spaced end portions;

e. said intermediate member comprising a filtering material and including an inner surface and an outer surface and having spaced end portions;

f. said inner member comprising a filtering material and including an outer surface and having spaced end portions;

g. said outer surface of said intermediate member being juxtaposed to said inner surface of said outer member substantially throughout their extent to at least substantially preclude axial passage of smoke across the area therebetween, and said outer surface of said inner member being juxtaposed to said inner surface of said intermediate member throughout the extent of said outer surface of said inner member to at least substantially preclude axial passage of smoke across the area therebetween while permitting transverse passage of smoke between said intermediate and inner members;

h. said intermediate member and said outer member being coextensive in axial length and said inner member being

shorter than said intermediate member to define inner cavity means within said intermediate member;

i. said inner member being discrete from said intermediate member and being securely held by said intermediate member against axial movement relative thereto;

j. said intermediate member being discrete from said outer member and being securely held by said outer member against axial movement relative thereto;

k. said inner member offering approximately the same resistance to passage of smoke as said intermediate member; and

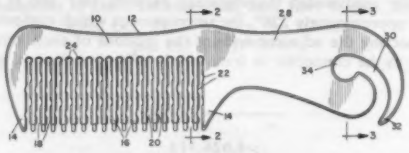
l. limited longitudinally extending, circumferentially spaced, outer cavity means defined in the outer surface of said intermediate member, said outer cavity means being of a length substantially no greater than the length of said inner member and corresponding portions of said intermediate member being embedded in said inner member to fixedly secure these members to each other;

whereby smoke passing through said filter element must travel through said inner cavity means and at least one of said inner and intermediate members.

4,026,307
AFRO COMB

Willie L. Morrow, 4167 Market St., San Diego, Calif. 92102

Filed Mar. 26, 1976, Ser. No. 670,730
Int. Cl.² A45D *24/00*
U.S. Cl. 132—11 R 3 Claims



1. A comb comprising:

a. a spine;

b. a plurality of straight parallel teeth defining a plane with said spine;

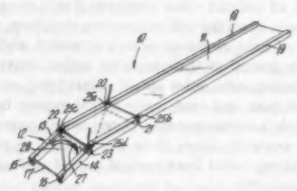
c. adjacent ones of said teeth defining channels therebetween and the opposed edges of adjacent teeth being straight and parallel and each of said edges having at least one cut-away portion therein to define expanded areas in said channels to permit the periodic expansion of hair clusters passed through said channels toward said spine;

d. each of said channels being expanded at the junctions of said channel - defining teeth with said spine, whereby upon combing the hair, bunching and wedging of the hair in the channels at the spine is prevented.

4,026,308
DENTAL FLOSS HOLDER

Lawrence R. Krivit, 14 Orchard Drive, Armonk, N.Y. 10504

Filed Oct. 17, 1975, Ser. No. 623,443
Int. Cl.² A61C *15/00*
U.S. Cl. 132—91 6 Claims



1. A dental floss holder comprising:

an elongated substantially rectangular body having an end portion at a predetermined angle to the main body portion, said end portion having a U-shaped cut out forming a pair of juxtaposed legs and including a pair of transverse slots in each leg thereof, and wherein,

the main body portion includes a rib extending along each side of the main body portion, said ribs having a pair of oppositely arranged slots at an intermediate portion of the main body, and,

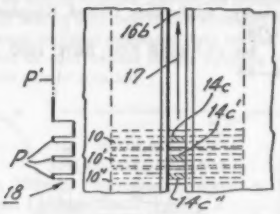
a second pair of oppositely arranged slots in the ribs on the end portion of the body, and,

whereby dental floss may be securely wrapped about the holder and held in a taut condition between the legs, said dental floss being initially wrapped within the slots in the intermediate portion of the main body, then within the slots in the end portion and then finally being inserted in the slots in the legs and finally wrapped within the oppositely arranged slots.

4,026,309
CHIP STRUCTURE

Robert Howard, Windham, N.H., assignor to Gamex Industries Inc., Hudson, N.H.

Division of Ser. No. 495,679, Aug. 8, 1974, Pat. No. 3,983,646.
This application May 12, 1976, Ser. No. 685,891
Int. Cl.² G07D *9/00*
U.S. Cl. 133—8 R 2 Claims



1. Means for counting chips having fluorescent stripes along their periphery and adapted to emit light of a predetermined wavelength when excited comprising:

a trough for supporting chips;

said trough having an elongated slot;

means for directing light towards said slot to excite said stripes;

means for scanning along said slot;

filter means positioned between said slot and said scanning means to pass light of only said predetermined wavelength;

said scanning means including means for generating a pulse for each scanned stripe;

means for counting said pulses to provide a count of said chips.

4,026,310
DRYING BOX FOR FOOTBALLS

Arthur A. Beauregard, Cumberland, R.I., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed July 26, 1976, Ser. No. 708,330
Int. Cl.² B08B *3/02*
U.S. Cl. 134—86 1 Claim

1. A portable cabinet for washing and drying a football comprising

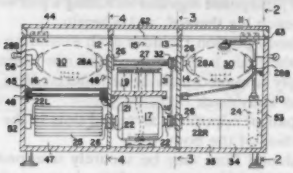
a cabinet housing a motor mounted in a first compartment,

a motor powered water circulating means leading to a spray unit located in a second compartment,

a motor powered air blower unit leading to an air heating means located in a third compartment,

said motor joined to shafting fitted with means to attach a football in said second and said third compartments to

rotate said attached footballs for the purpose of washing and drying respectively, and the water circulating means



and the air blower unit are both powered by the said motor.

4,026,311

APPARATUS FOR CLEANING INSIDE AND OUTSIDE SURFACES OF CONTAINERS

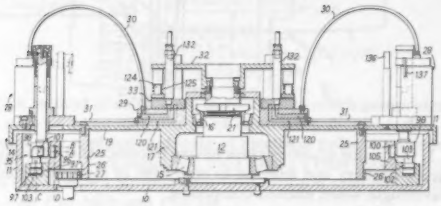
John Maxwell Jackson, Potters Bar, England, assignor to Cleamax Limited, Potters Bar, England

Filed Mar. 20, 1975, Ser. No. 560,143

Claims priority, application United Kingdom, Mar. 21, 1974, 12651/74

Int. Cl.² B08B *3/00*; B67C *1/00*

U.S. Cl. 134—48 **27 Claims**



6. Apparatus for cleaning open-mouthed containers of a given size, the apparatus comprising a frame; a turret rotatably mounted on said frame; a plurality of pot assemblies supported on the turret, each pot assembly having a core, a shell, and a lid co-operating with said core and shell to define a cavity for reception of one of said containers and said cavity having at least one wall; means for centering the container in the cavity, the cavity having a shape corresponding approximately to that of the container and a size such that the container therein subdivides the cavity into two chambers in which the wall of the cavity is spaced close to the inside and outside surface of the container, and conduit means for passing cleaning fluid through said chambers so that the cleaning fluid fills the chambers and flows along the inside and outside surfaces of the container, drive means operable to rotate the turret so that each pot assembly passes in succession past a container unloading station and a container loading station, lid control means operable to move the lid of each pot assembly into an open position immediately prior to passage of the pot assembly past said unloading station to permit ejection of a cleaned container at said unloading station and introduction of a container to be cleaned into the cavity of the pot assembly at said loading station, said lid control means also being operable to move the lid of each pot assembly into a closed position immediately after passage of the pot assembly past said loading station, and valve means for regulating flow of fluid through said conduit means and chambers only during passage of each pot assembly between said loading station and said unloading station.

4,026,312

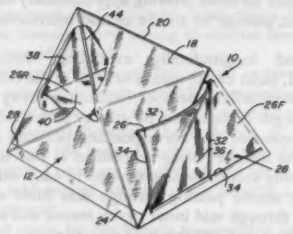
SUBFRAME FOR A FOLDABLE FREE-STANDING TENT

Allan E. Beavers, Littleton, Colo., assignor to T.A. Pelsue Company, Englewood, Colo.

Division of Ser. No. 519,624, Oct. 31, 1974, Pat. No. 3,941,140. This application Mar. 1, 1976, Ser. No. 662,879

Int. Cl.² A45F *1/16*

U.S. Cl. 135—3 R **9 Claims**



1. In a subframe for use with one or more similar subframes to define a tent frame where said subframe includes a centrally-located stop-forming connector and a pair of jointed struts each consisting of two rigid sections whose adjacent ends are pivotally attached to said connector in a manner such that said sections are movable between a folded condition side-by-side relation to one another and an unfolded condition where the angular relationship therebetween exceeds 180° and is less than approximately 220°, the improvement which comprises: connecting the adjacent ends of the sections of each jointed strut to the connector in transversely offset overlapped relation.

4,026,313

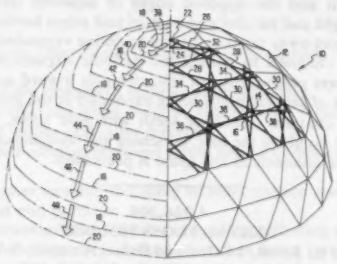
COLLAPSIBLE SELF-SUPPORTING STRUCTURES

Theodore R. Zeigler, 2007 R St., NW., Washington, D.C. 20009

Filed July 13, 1976, Ser. No. 704,811

Int. Cl.² E04B *1/12*, *1/347*

U.S. Cl. 135—4 R **10 Claims**



1. A collapsible, self-supporting structure, comprising in combination:

a network of column - like elements freely pivotally joined together to form the self-supporting structure, there being groups of said elements which intersect and are freely pivotally joined at their ends to define inner and outer apical points, said outer apical points lying on the surface of revolution and said inner apical points being paired each with a corresponding outer apical point and being spaced inwardly from their corresponding outer apical points along radial lines normal to said surface of revolution;

therebeing at least three elements forming each of said groups which elements radiate from their corresponding apical points to join with other elements at other sur-

rounding apical points, with those elements radiating from each inner apical point lying essentially in a common plane and radiating from such inner apical point to a plurality of surrounding outer apical points, whereby the network is characterized by a series of planes essentially within which lie elements radiating from and between a number of outer apical points;

each pair of corresponding inner and outer apical points having a plurality of pairs of elements which radiate therefrom and cross in scissors-like fashion;

there being first zones symmetrical with said surface of revolution defined by crossing points of certain of said pairs of elements and second zones symmetrical with said surface of revolution defined by crossing points of others of said pairs of elements, said first and second zones being disposed alternately throughout the structure; and

first means for pivotally joining said certain pairs of elements and second means associated with said others of said pairs of elements for permitting a predetermined limited free sliding relation therebetween.

4,026,314

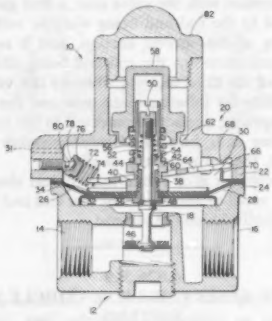
HIGH PRESSURE SAFETY VALVE

Jesse H. Turner, Fort Wayne, Ind.; Claud C. Hurd, Riverside, and Frank Fiedler, Jr., Rowland Heights, both of Calif., assignors to Essex International, Inc., Fort Wayne, Ind.

Filed Oct. 29, 1975, Ser. No. 626,817

Int. Cl.² G05D *16/06*

U.S. Cl. 137—116.5 **5 Claims**



1. A high pressure safety valve, comprising:

a housing having an inlet, an outlet and a main passageway connecting said inlet and said outlet;

main valve means disposed in said main passageway for controlling flow therethrough;

differential pressure responsive means operably connected to said valve means for moving said main valve means toward and away from the closed position in response to differentials in pressure between a reference pressure and the pressure at said oulet;

snap acting operator means comprising a pivoted arm member and overcentering spring biasing means operatively connected to said differential pressure responsive means for moving said main valve means from the closed position to the open position, and vice versa, with a snap action when the differential pressure responsive means moves in a direction from the close position to the open position, and vice versa; and

relief valve means operated by said differential pressure responsive means for relieving the pressure at said outlet whenever said outlet pressure rises above a predetermined level and said main valve is closed.

4,026,315

VENTILATION SYSTEM FOR ROTATING WATER FEEDS

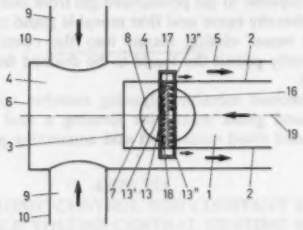
Albert Huber, Moriken, and Reinhard Hurlimann, Zurich, both of Switzerland, assignors to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed Feb. 19, 1976, Ser. No. 659,564

Claims priority, application Switzerland, Apr. 8, 1975, 4425/75

Int. Cl.² F28D *11/02*

U.S. Cl. 137—171 **8 Claims**



1. A ventilation system for rotating water feeds particularly for water-cooled generators comprising feed duct means and discharge duct means arranged coaxially relative to each other and defining an axis of rotation, and bypass means including at least one inlet and at least one outlet arranged between said feed duct means and said discharge duct means, with said at least one inlet of said bypass means opening in the space proximate said axis of rotation.

4,026,316

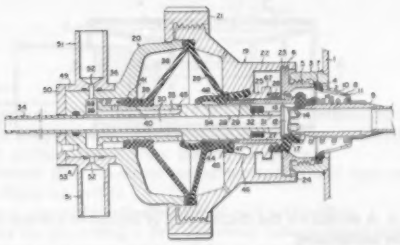
VALVE MECHANISM

Klaas Schots, Tilburg, Netherlands, assignor to Hopfma Anstalt, Schaan, Liechtenstein

Filed Mar. 26, 1974, Ser. No. 454,822

Int. Cl.² F16L *37/28;* **B65D** *83/14*

U.S. Cl. 137—212 **7 Claims**



1. A valve mechanism for connection with a connecting member on a vessel for draining liquid from the vessel with a pressurized gas through pipe means and vessel closing means in the connecting member, the vessel closing means having a closed position blocking entry of gas into the vessel and flow of liquid from the vessel and an open position permitting entry of gas into the vessel and the flow of liquid from the vessel, comprising:

a. a connecting piece having means therewith for mounting with the connecting member, said connecting piece further having a chamber therein for receiving the pressurized gas;

b. supply means for providing the pressurized gas to said connecting piece;

c. outlet means for conveying the liquid from the connecting piece;

d. first movable gland means mounted in said connecting

piece for engaging the vessel closing means externally of the pipe means in the vessel for moving the vessel closing means into the open position;

e. second movable gland means extending through said chamber in said connecting piece to said supply means, having means therewith for passing liquid from the closing means to said outlet means, and further having means therewith for conveying the pressurized gas to the enclosed space in said chamber;

f. a first movable adjusting member mounted in said chamber of said connecting piece and connected to said first gland means, said first movable adjusting member moving in response to the pressurized gas from said supply means to thereby cause said first movable gland means to move the vessel closing means into the open position and thereby permit the liquid to be drained from the vessel; and

g. a second movable adjusting member coupled to said second gland means for forming a seal between said second gland means and said connecting piece.

4,026,317

WATERSEAL

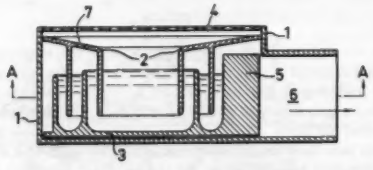
Lars Ekstrom, 11, Stallbacken, Djursholm, Sweden

Continuation of Ser. No. 390,675, Aug. 22, 1973, abandoned. This application Mar. 26, 1975, Ser. No. 562,367

Claims priority, application Sweden, Aug. 28, 1972, 11088/72

Int. Cl.² F16K 9/00

U.S. Cl. 137—216.1 1 Claim



1. A device for the discharging of liquids to a sewer connection comprising:

an upper plate defining a central aperture for receiving the liquid to be discharged,

said upper plate supporting a plurality of spaced downwardly depending cylindrical ring portions,

a bottom plate supporting a plurality of spaced upwardly extending cylindrical ring portions,

an apertured annular wall for said device for forming with said upper plate and said bottom plate an enclosed chamber,

said downwardly depending and said upwardly extending ring portions extending toward but stopping short of said bottom and upper plates respectively and being alternately interleaved in vertically overlapped relation to form thereby a plurality of waterseals joined by an air space,

outlet means communicating with the aperture in said annular wall,

and means in said upper plate for venting said air space.

4,026,318

VALVE FOR GIANT TIRES

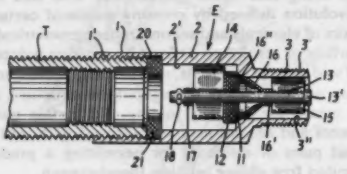
Daniel Lejeune, Clermont-Ferrand, France, assignor to Compagnie Generale des Etablissements Michelin, raison sociale Michelin & Cie, Clermont-Ferrand, France

Filed Mar. 6, 1975, Ser. No. 556,163

Claims priority, application France, Mar. 11, 1974, 74.08430

Int. Cl.² F16K 15/20

U.S. Cl. 137—223 5 Claims



1. A valve comprising a tubular element and a valve member movable with the tubular element for opening and closing the valve.

the tubular element comprising a first section for connection to the valve stem of a giant tire or the like, a second section forming an extension of the first section, and a third section forming an extension of the second section, and the tubular element being formed with a bore which extends through the three sections and which widens in the direction from the third section to the second section and thereby forms a valve seat, and

the valve member comprising a rod extending longitudinally of the bore, a valve-sealing member connected to the rod for cooperation with the valve seat, a first guide member connected to the rod and being slidable within the widened bore of the second section, and a second guide member connected to the rod and being slidable within the bore of the third section, whereby the valve has particular utility for inflating giant tires and the like,

further comprising a spacer connected to the rod and abutting, at one end, the second guide member and, at the other end, the valve-sealing member,

wherein the spacer is of cylindrical-conical shape and is of relatively small diameter at said one end and of relatively large diameter at said other end.

4,026,319

HYDRAULIC RESERVOIRS FOR VEHICLE BRAKING SYSTEMS

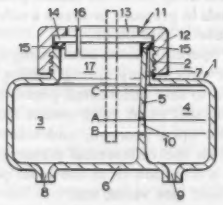
John Flory Pickering, Solihull, England, assignor to Girling Limited, Birmingham, England

Filed Dec. 11, 1975, Ser. No. 639,763

Claims priority, application United Kingdom, Dec. 21, 1974, 55346/74

Int. Cl.² F15B 7/08

U.S. Cl. 137—255 5 Claims



1. An hydraulic reservoir for a vehicle braking system having at least two braking circuits comprising a closed container

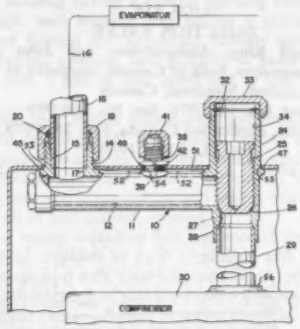
provided in its upper part with a filler opening and a relief opening and divided internally by a partition into two chambers which are horizontally adjacent to each other when the container is oriented with the openings uppermost, the filler opening communicating with one of the chambers, and the relief opening communicating with the other chamber, the partition being provided at an intermediate height thereof with a passage providing fluid communication between the two chambers, and the container being provided with outlets from the chambers adapted to be connected to the respective braking circuits, a fluid level sensor arranged in one of the chambers to detect a fall of the fluid level in that chamber to a level that is above the minimum level at which fluid can flow through the passage to the other chamber when said openings are uppermost and open to atmosphere, a detachable filler cap adapted to close the filler opening, and releasable sealing means adapted sealably to close one of the openings so as to seal in use the chamber connected to that opening against atmosphere when the liquid level is above the top of the passage in at least one of the chambers, the arrangement being such that in use the upper part of the chamber that is not sealed by the sealing means is maintained substantially at atmospheric pressure.

4,026,320

VALVE ASSEMBLY FOR PANEL MOUNTING

Darwin R. Grahl, Newark, N.Y., assignor to Parker-Hannifin Corporation, Cleveland, Ohio

Filed Aug. 7, 1975, Ser. No. 602,798
Int. Cl.² F25B *49/00*, *45/00*
U.S. Cl. 137—343 **3 Claims**



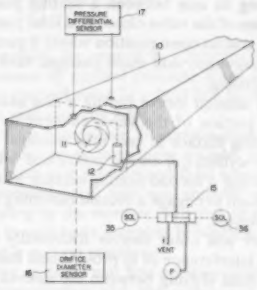
1. A valve assembly for mounting on a panel of flat bendable material, said assembly comprising an elongated body having a longitudinal bore and a longitudinal axis, said body including a first boss projecting from one end of the body, a second boss projecting from the other end of the body, and a third boss projecting from the body between the first and second bosses, each boss projecting radially with respect to said axis and in the same direction, a port in said body in axial alignment with said first boss and intersecting said bore, a valve element mounted in said first boss for movement to open and close said port, fluid flow passages in said second and third bosses communicating with said bore, said body having a raised abutment face at the inner end of each of said first and second bosses, said faces lying in a common plane spaced a predetermined distance from said longitudinal axis, said third boss having a threaded exterior, a jam nut threaded onto said threaded exterior, a raised abutment surface at the inner end of the third boss lying in a second plane that is parallel to said common plane and radially spaced from said axis a distance that is less than said predetermined distance whereby when said body is placed on one side of said flat panel with said bosses projecting through holes in said panel that are in alignment with said bosses and with said abutment faces engaging said one side of the panel, said jam nut may be threaded against the other side of said panel for first tightly clamping the panel against said abutment faces while said panel remains spaced from said abutment surface and whereby upon further threading of the jam nut the nut will cause the panel to bend slightly and be more tightly clamped against said abutment faces, and said abutment surface being sufficiently close to said plane whereby upon such slight bending the panel will engage said abutment surface to limit the amount of such bending.

4,026,321

ELECTRONIC CONTROL FOR CONSTANT AND VARIABLE VOLUME CENTRAL HEATING AND AIR-CONDITIONING SYSTEMS

H. Taylor Kahoe, Mentor; George E. Coultas, Euclid, and Dana W. Skipworth, Cleveland, all of Ohio, assignors to Kahoe Laboratories, Inc., Eastlake, Ohio

Filed Dec. 12, 1975, Ser. No. 640,043
Int. Cl.² G05D *7/06*
U.S. Cl. 137—487 **6 Claims**



1. Apparatus for controlling the flow rate of conditioned air through a supply duct to an enclosed space for maintaining a desired ambient temperature therein comprising:

adjustable flow restrictor means located in said duct and defining an orifice,

control means for adjusting the size of said orifice,

means for generating a first electrical voltage signal representative of the logarithm of the square of a dimension of said orifice,

means for generating a second electrical voltage signal representative of the logarithm of the square root of the pressure differential across said orifice

summation circuit means for electrically adding said first and second electrical voltage signals to produce a summation voltage signal,

means for comparing said summation voltage signal with a predetermined reference voltage level and for generating an "increase" control voltage signal when said summation voltage signal is greater than said reference voltage level and a "decrease" voltage signal when said summation voltage signal is less than said reference voltage level,

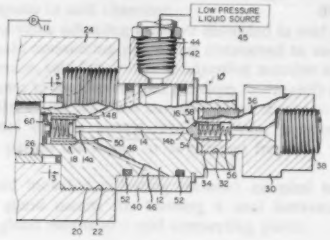
means responsive to said "increase" control voltage signal for reducing the size of said orifice, and

means responsive to said "decrease" control voltage signal for increasing the size of said orifice.

4,026,322
RECIPROCATING PUMP CHECK VALVE ASSEMBLY

Benjamin A. Thomas, Burton, Wash., assignor to Flow Industries, Inc., Kent, Wash.

Filed Feb. 11, 1976, Ser. No. 657,180
Int. Cl.² F16K *15/02*
U.S. Cl. 137—512 **10 Claims**



1. A valve assembly adapted for use with a very high pressure reciprocating pump, said valve assembly comprising:

a. a housing having a longitudinal axis and a longitudinally aligned main passage with an inlet end and a outlet end,

b. a check valve at the outlet end of the main passage to permit forward flow through the oulet end of the main passage and to prevent reverse flow back through said main passage,

c. said housing having an annular low pressure inlet passage surrounding the main through passage and communicating therewith,

d. an annular valve element having a lengthwise axis and moveable along its axis between a seating position where a first end portion of the valve closes said inlet passage from said main passage, and an open position where it permits flow form said inlet passage into said main passage, said annular valve element comprising:

1. an outer annular sleeve having a first seating surface at the first end portion of the valve element to engage a first matching seating surface at said inlet passage,

2. an inner cylindrical sleeve positioned within the outer sleeve and having a second seating surface at the first end of the valve element to engage a second matching seating surface at the inlet passage, and

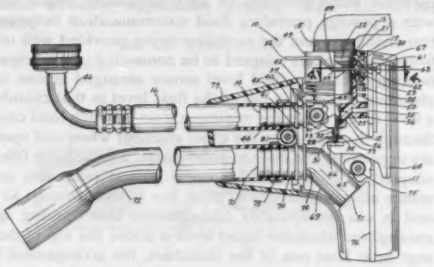
3. said inner and outer sleeves frictionally engaging each other with an interference fit to provide seal therebetween and permit some axial shifting between the sleeves in response to fluid pressure in the main passage to provide proper closing arrangement of the valve first and second seating surface of the valve elements with both the first and second matching seating surfaces.

4,026,323
FAUCET COUPLER ASSEMBLY

John D. Goodlaxson, Colfax, Iowa, assignor to The Maytag Company, Newton, Iowa

Filed Feb. 23, 1976, Ser. No. 660,322
Int. Cl.² B05B *1/22*
U.S. Cl. 137—562 **14 Claims**

1. A coupler assembly for connecting a portable washing machine to a faucet disposed generally above a sink, the combination comprising: a coupler body defining a conduit having an inlet end connectable to said faucet and an outlet end connectable to said machine, said body further including a pressure release opening intermediate said inlet and outlet ends; valve means biased to a closed position for sealing said pressure release opening against leakage of liquid; means for connecting said inlet end to said faucet including a retaining ring at said inlet end axially movable from a faucet locking position to a faucet receiving-releasing position; spring means for biasing said retaining ring to said faucet locking position; and a coupler release mechanism associated with said coupler body for sequentially depressurizing and decoupling said coupler assembly from said faucet including connecting means operatively connecting said retaining ring and said valve means and movable from a first posture to a second posture for actuating said valve means to relieve the pressure in said conduit while said spring means maintains said retaining ring substantially unmoved from said faucet locking position and

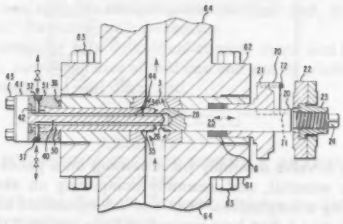


then subsequently movable from said second posture to a third posture for overcoming said spring means to axially move said retaining ring to said faucet receiving-releasing position whereby initial movement of said connecting means releases the pressure in said conduit and further movement of said connecting means releases the coupler assembly from said faucet.

4,026,324
INJECTION VALVE

David Campbell King, Amherstview, and John Anthony Kendall, Gananoque, both of Canada, assignors to Du Pont of Canada Limited, Montreal, Canada

Filed Jan. 16, 1976, Ser. No. 650,093
Claims priority, application Canada, Feb. 28, 1975, 221181
Int. Cl.² F16K *19/00*
U.S. Cl. 137—605 **5 Claims**



1. A valve for communicating to a fluid stream flowing in pipe sections joined by abutting flanges comprising:

a valve body adapted for connection between said abutting flanges and having a plenum chamber in communication with said pipe sections, said plenum chamber being intersected by a bore passing completely through the valve body from one end to the other;

a first seating assembly positioned in one end of said bore, said first seating assembly being adapted to be moved into and out of the bore and having a seating surface to close and to open the valve;

a second seating assembly positioned in the other end of said bore, said second seating assembly having a hollow center and at least one port leading into said hollow center, the inserted portion of each of the two seating assemblies having a seating surface at the end thereof; and

a ported stem assembly housed in the hollow center of the

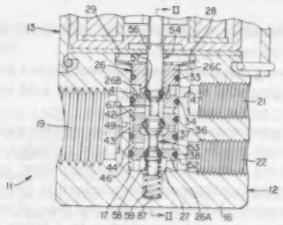
second seating assembly, said ported stem assembly having at least one port extending along the stem from a position adjacent to the port in said second seating assembly to a position adjacent the seating surfaces of the seating assemblies to provide when the valve is in the open position, fluid flow communication between the port in said second seating assembly and the plenum chamber in communication with the pipe sections.

4,026,325

MINIATURE FOUR-WAY VALVE

Stanley M. Loveless, Kalamazoo, Mich., assignor to General Gas Light Company, Kalamazoo, Mich.

Filed Mar. 1, 1976, Ser. No. 662,535
Int. Cl.[2] F16K 11/02
U.S. Cl. 137—625.26 **18 Claims**



1. A four-way valve assembly, comprising:

a valve housing having a central opening extending therethrough, said housing also having a plurality of ports formed therein and extending radially outwardly from said central opening, said plurality of ports including an inlet port, a pair of load ports and at least one exhaust port;

sleevelike liner means stationarily positioned within said central opening, said liner means having a plurality of elastomeric seal rings disposed in surrounding relationship thereto and spaced axially therealong, said seal rings being disposed in supporting and sealing engagement with the wall of said central opening;

said liner means including first and second sleevelike liner members disposed in axial alignment with one another and positioned with their adjacent inner ends in abutting engagement, each of said liner members having an axially elongated center opening of a first diameter, at least one of said liner members having an enlarged opening means formed on the inner end therof, said enlarged opening means being defined at least in part by a wall which projects radially outwardly from said center opening, and the inner end of the other liner member also having a wall which projects radially outwardly from said center opening whereby said walls are disposed substantially opposite one another and define an enlarged annular space therebetween;

said opposed walls as formed on the adjacent inner ends of said liner members being substantially conical and flaring outwardly from the respective center opening and extending in an axial direction toward the inner end of the respective liner member;

elongated valve plunger means disposed within said liner means and supported for shiftable movement axially thereof, said valve plunger means having an elastomeric sealing ring mounted in surrounding relationship thereto and positioned within said enlarged annular space, said sealing ring having a maximum diameter which is greater than said first diameter whereby said annular sealing ring is positioned to abuttingly sealingly engage one or the other of said walls when said valve plunger means is shifted axially between its two extreme operational positions; and

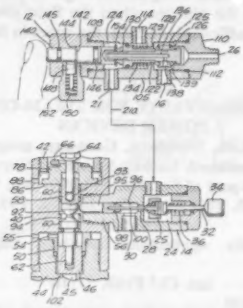
said liner means having opening means formed therein and extending radially therethrough for communicating directly with said enlarged annular space, said opening means also communicating at the radially outer end thereof with said inlet port.

4,026,326

ACTUATOR PILOT FOR FLUID PRESSURE MONITORING SAFETY SYSTEM

Richard E. Wells, Westminster; Victor E. Derval, Seal Beach, and John D. Muchow, Cerritos, all of Calif., assignors to Willis Oil Tool Co., Long Beach, Calif.

Division of Ser. No. 440,165, Feb. 6, 1974. This application Sept. 22, 1975, Ser. No. 615,368
Int. Cl.[2] F16K 17/00; F15B 13/01
U.S. Cl. 137—625.66 **2 Claims**



1. An actuator pilot, for control by a monitor pilot, to control the transmission of control pressure from a pressurized fluid source to a shut-off valve in a fluid line having a control connection with said monitor pilot,

said actuator pilot comprising, in combination:

a body having four ports comprising an inlet port for communication with said pressurizied fluid source, an outlet port for communication with said shut-off valve, a pilot port for venting by the monitor pilot and an exhaust port,

a valve spool in said body movable between a normal first position and a second position,

said valve spool at its normal first position placing the inlet port in communication with the outlet port to keep the shut-off valve open,

said valve spool at its second position cutting off the inlet port from the outlet port and placing the outlet port in communication with the exhaust port,

said valve spool having a relatively small area facing in one direction in constant communication with the inlet port to cause bias pressure from the inlet port to bias the valve spool towards its second position,

said valve spool having a relatively large area facing in the opposite direction to receive fluid pressure to urge the valve spool towards its first position,

said valve spool at its first position placing said relatively large area in communication with the inlet port to receive fluid pressure from the inlet port to dominate the fluid pressure on the relatively small area to keep the valve spool at its first position as long as the pilot port is not vented,

venting of the pilot valve reducing the pressure on the relatively large area to permit the pressure on the relatively small area to shift the valve spool to its second position;

manually operable means to shift the spool from its second position to its normal first position in opposition to said bias pressure,

whereby with the shut-off valve closed and pressure in the fluid line below a normal range, the spool may be shifted

manually from its second position to its normal first position temporarily to cause the shut-off valve to open to build up pressure in the fluid line to a normal range and thus cause the monitor pilot to cut off flow from the pilot port to cause the fluid pressure on the relatively large area to rise to a magnitude to keep the spool at its normal first position as long as the pressure in the fluid line remains in said normal range;

a plunger separate from the valve spool supported for independent movement in said body in alignment with the valve spool and with one end being accessible from the exterior of the actuator pilot,

said plunger being normally held by fluid pressure at a position protruding beyond one end of said body, said plunger being manually movable to an inner position to engage and shift the valve spool from its second position to its normal first position; and

detent means to engage the plunger at its inner position, said detent means being of a strength to yield to the fluid pressure on the plunger when the fluid pressure on the spool rises sufficiently to keep the spool in its normal first position.

4,026,327

RAPID OPENING VALVE FOR STEAM-OPERATED POWER DEVICES

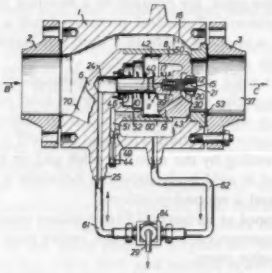
Hans Deinlein-Kalb, Nurnberg, Germany, assignor to AEG-Kanis Turbinenfabrik GmbH, Nurnberg, Germany

Continuation-in-part of Ser. No. 432,099, Jan. 9, 1974, Pat. No. 3,958,600. This application July 22, 1975, Ser. No. 598,025

Claims priority, application Germany, July 24, 1974, 2436090

Int. Cl.² F16K *17/10*

U.S. Cl. 137—630 **6 Claims**



1. A rapid opening valve assembly arranged in the path of flow of a pressurized fluid and having a valve housing provided with an inlet and an outlet for the fluid flow; a valve seat held in the housing at the valve outlet; a movable valve member cooperating with the valve seat and having a closed, seated position and an open, unseated position; the valve housing defining a space upstream of the movable valve member that constitutes the high pressure side of the valve assembly and a space downstream of the movable valve member that constitutes the low pressure side of the valve assembly; the improvement comprising in combination:

a. a cylinder body held in said valve housing at said high pressure side; said cylinder body including a cylindrical guide sleeve;

b. a valve piston slidably received in said guide sleeve for being guided by the latter in its reciprocation towards and away from said valve seat; said valve piston constituting said movable valve member; said valve piston having an annular end face exposed to the pressure in said high pressure side;

c. a cylinder chamber surrounded by said guide sleeve and bounded by said valve piston;

d. a valve spring disposed in said cylinder chamber for continuously urging said piston towards said valve seat, said valve spring opposing the force exerted on said annular end face of the valve piston and derived from the pressure in said high pressure side;

e. means defining a bore in said cylinder body; said bore extending from said cylinder chamber;

f. a spindle constituting an integral axial extension of said valve piston and slidably received in said bore;

g. a spindle chamber constituted by said bore and bounded by a free end face of said spindle;

h means defining an axial bore in said valve piston;

i. a servovalve accommodated in said axial bore of said valve piston, said servovalve including

1. a seat member;

2. a servopiston slidable in said axial bore to assume a closed position in which it engages said seat member and an open position in which it is spaced from said seat member; said servopiston having an annular end face;

3. a servochamber constituted by said axial bore and bounded by said servopiston;

4. a servospring disposed in said servochamber for continuously urging said servopiston towards said seat member;

j. throttled bypass means maintaining communication between said high pressure side and said cylinder chamber;

k. means defining a channel in said valve piston; said channel maintaining continuous communication between said cylinder chamber and said annular end face of said servopiston for exposing said servopiston to a force opposing the force of the servospring; said channel maintaining communication between said cylinder chamber and said low pressure side through said seat member of said servovalve in said open position of said servopiston; said communication between said cylinder chamber and said low pressure side being blocked by said servopiston in its said closed position;

l. means maintaining continuous communication between said spindle chamber and said servochamber;

m. conduit means connecting said high pressure side of said valve assembly with said spindle chamber; and

n. an auxiliary valve arranged in said conduit means; said auxiliary valve having a first position in which communication is maintained between said high pressure side and said spindle chamber for generating the same pressure in said spindle chamber that prevails in said high pressure side; said auxiliary valve having a second position in which communication is blocked between said high pressure side and said spindle chamber and in which said spindle chamber is depressurized.

4,026,328

LAVATORY SPOUT

Merritt J. Nelson, Sparta, Mich., assignor to Zin-Plas Corporation, Grand Rapids, Mich.

Filed July 28, 1975, Ser. No. 599,604

Int. Cl.² F16K *21/00*

U.S. Cl. 137—801 **12 Claims**

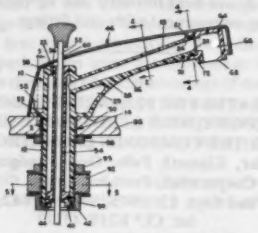
1. A lavatory spout comprising:

a one-piece integrally molded body having an outwardly extending hollow straight spout portion with an open outer end and a depending hollow shank portion, said spout and shank portions being in open communication so that water can pass up through the shank and spout portions, means in a lower portion of the shank portion to supply water thereto, a bottom cover flange on said spout portion extending outwardly from a bottom portion thereof and along the length thereof;

a separate elbow conduit secured to the outer open end of the body spout portion and providing an elbow passage at the outer end of the spout portion;

a cover for the body, the cover having a top and depending

sidewalls extending around the spout portion, the elbow conduit and the upper portion of the shank portion, the sidewalls of the cover meeting the side edges of the cover flange to enclose the spout portion; and



means for securing the cover to the body and to the elbow conduit.

4,026,329

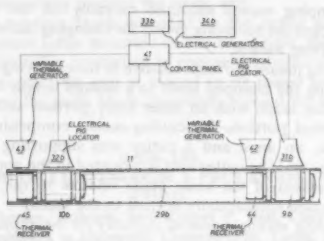
METHOD AND APPARATUS FOR REMOTELY AND RELEASABLY SEALING A PIPELINE

Albert L. Thompson, Houston, Tex., assignor to Texas Pipe Line Company, Houston, Tex.

Division of Ser. No. 427,777, Dec. 26, 1973, Pat. No. 3,908,682, which is a continuation of Ser. No. 253,386, May 15, 1972, abandoned. This application June 30, 1975, Ser. No. 591,565

Int. Cl.² F16L *55/12*

U.S. Cl. 138—97 **9 Claims**



1. A method for sealing off a long section of pipe having two internal pipe sealing pigs moving with the pipe fluid toward the long section comprising the steps of,

a. generating a first thermal command signal of one temperature at the upstream end of the pipe section for sealing the pipe section with an aft pig responsive to the one temperature at the upstream end of the pipe section to be sealed off, and

b. generating a higher thermal command signal of a second temperature higher than the first temperature for sealing the pipe with the forward pig responsive to the higher second temperature at the downstream end of the pipe section to be sealed off.

5. A pipe mechanism for sealing off a section of pipe of moving fluid comprising,

a. two pigs positioned in the pipe of moving fluid at a predetermined distance apart,

b. expanding means on each of said pigs for releasably sealing said pigs in the pipe for sealing off the pipe section between said pigs,

c. variable thermal generator means at each end of said section of pipe to be sealed off for generating thermal command signals of two different precise temperature levels,

d. thermal receiver means in each of said pigs, each thermal command signal receiver means being compatible with a different thermal command signal generator means and responsive to its two temperature level thermal command signals for controlling said expanding means for releasably sealing said pigs in the pipe, and

e. each of said thermal command signal receiving means being responsive to one of said two temperature levels of its respective compatible variable thermal command signal generating means for sealing said pigs at said pipe section for work thereon.

4,026,330

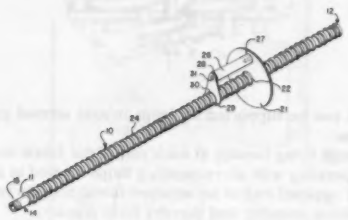
DEVICE FOR FEEDING GAS INTO UNDERGROUND CAVITIES TO ASPHYXIATE RODENTS

Kenneth Michael Dunn, 2025 Alice St., Santa Cruz, Calif. 95062

Filed Feb. 3, 1976, Ser. No. 654,766

Int. Cl.² F16L *55/00*

U.S. Cl. 138—103 **1 Claim**



1. A device for transmitting asphyxiating gas from a source through an opening and into an underground cavity for asphyxiating rodents, comprising in combination

an elongated flexible conduit having first and second ends and a central opening therethrough for the transmittal of gases from the first end of the conduit to the second;

means fixed to a first end of the conduit for attachment to the source of asphyxiating gas;

a planar shield fixed to the outer surface of the conduit a predetermined distance from the conduit second end and extending normal to the conduit longitudinal axis a sufficient distance to cover the opening into the underground cavity when the second end is inserted through the opening and into the cavity, and

an elongated heat insulating handle having one end fixed to said planar shield and the other end fixed to said conduit at a position between the shield and the conduit first end for mounting the handle in parallel spaced relationship to the conduit to enable handling the conduit whereby by attachment of the first conduit end to a gas source and placement of the second conduit end into an opening in an underground cavity, the rodents therein can be asphyxiated.

4,026,331

JOINTING OF FABRIC ENDS TO FORM AN ENDLESS STRUCTURE

David Logan Lees, Tottington, and Colin Alfred Wild, Littleborough, both of England, assignors to Scapa-Porritt Limited, Blackburn, England

Filed Sept. 2, 1975, Ser. No. 609,713

Claims priority, application United Kingdom, Sept. 27, 1974, 42051/74

Int. Cl.² D03D *3/04*; D21F *7/10*

U.S. Cl. 139—383 A **12 Claims**

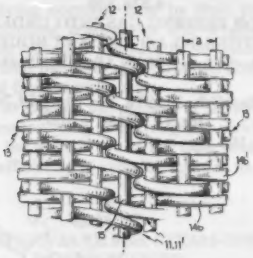
1. For use with a paper machine, a forming fabric having a body and a crimp pattern, comprising:

a first group of warp yarns including first warp yarns folded back and second warp yarns in alignment and substantial

abutment with said first warp yarns to form a first group of loops;

a second group of warp yarns including third warp yarns folded back and fourth warp yarns in alignment and substantial abutment with said third warp yarns to form a second group of loops;

said second group of loops being spaced from said first group of loops inwardly of the fabric body a distance substantially equal to the spacing between weft yarns in the fabric so that when an end weft yarn is received through the loops in said first group of loops, the end weft



yarn can be supported by loops in said second group of loops;

said loops being located at each end of the fabric body and cooperating with corresponding loops located at an adjacent opposed end of an adjacent fabric body to receive a retaining member and thereby form a seam;

said folded back warp yarns each having an inherent crimp therein which is compatible with the crimp pattern of the fabric body, and

individual warp yarns of said folded back warp yarns being distributed regularly widthwise of the fabric so that a warp cover exceeds 80%.

4,026,332

MACHINE FOR MOUNTING METAL WIRE HANDLES ON POTS, PAILS AND SIMILAR CONTAINERS

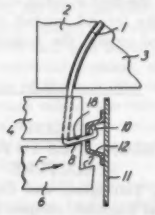
Hans Kristian Werdelin, Nyborg; Knud Verner Hansen, Bronshoj, and Jens Holst Andersen, Farum, all of Denmark, assignors to Dansk Svejsemaskine Farrik A/S, Copenhagen, Denmark

Filed May 10, 1976, Ser. No. 685,125

Claims priority, application Denmark, May 9, 1975, 2054/75

Int. Cl.² B21F *15/10*

U.S. Cl. 140—93 B **5 Claims**



1. In a machine for mounting wire handles on containers provided with handle fittings, said machine having means for positioning a container and orienting its fittings in a predetermined direction and means for forming a wire handle to generally U-shaped and positioning the ends thereof to extend downwardly adjacent said fittings, the improvement comprising:

bending tools including reciprocable members movable in one direction to bend the ends of a wire handle inwardly toward said fittings to define first bends;

said machine including further means for causing said members to engage said handles at positions spaced from said first bends and form second inward bends whereby said first bends are bent inwardly and upwardly into handle-mounting engagement with said fittings.

4,026,333

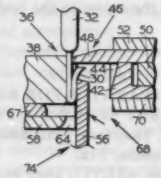
APPARATUS FOR PREPARING ELECTRONIC COMPONENT WIRE LEADS PRELIMINARY TO MOUNTING THE COMPONENTS ON CIRCUIT BOARDS

Ray V. Keller, Klamath Falls, Oreg., assignor to Ventures Unlimited Corporation, Portland, Oreg.

Filed Sept. 12, 1975, Ser. No. 612,951

Int. Cl.² B21F *45/00*

U.S. Cl. 140—105 **8 Claims**



1. Apparatus for preparation of electronic component leads, comprising:

a. receiving means for receiving the leads into the apparatus,

b. clamping means mounted movably on the apparatus adjacent the receiving means for clamping the leads in the receiving means,

c. cutting means movable relative to the receiving means for cutting the clamped leads to a desired length for providing the leads with an inner body portion and an outer terminal portion, the cutting means comprising a knife blade, an anvil and a cutter arm supporting the knife blade, and the cutter arm is mounted in the apparatus for movement of the knife blade relative to the anvil in a direction substantially normal to the leads,

d. bending means mounted movably on the apparatus adjacent the receiving means for bending the terminal portions of the leads to a selected angle, the bending means comprising a bending plate positioned adjacent the anvil and movable relative thereto in a direction substantially normal to the leads,

e. holding means located opposite the bending means and movable relative to the receiving means for holding the body portions of the leads as the terminal portions are bent by the bending means,

f. squeezing means movable relative to the receiving means for further bending the bent terminal portions of the leads and squeezing them to a predetermined position relative to the body portions of the leads,

g. linkage means interconnecting the clamping means, the cutting means, the bending means, the holding means and the squeezing means for operating them on a timed sequence, and

h. power means joined to the linkage means for operating the latter,

i. the linkage means comprising

1. a box frame,

2. an actuating rod supported movably by the box frame for movement therein,

3. cam means mounted centrally on the actuating rod for movement therewith,

4. a rocker arm interengaging the actuating arm and the power means for moving the actuating arm in an activating direction and in a return direction,

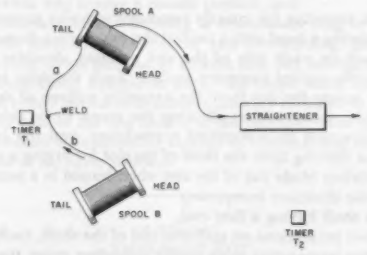
5. an articulated cam follower comprising
   a. bearings for engagement with the cam means,
   b. a first push down arm pivotally interengaging the bearings and the box frame, and
   c. a second spring biased push down arm pivotally connected on one end to the bearings to urge the bearings into contact with the cam means,
6. a cutter arm joined centrally to the other end of the second push down arm for movement substantially normal to the leads when the bearings of the articulated cam follower initially engage the cam means when the cam means moves in the activating direction,
7. the knife blade being mounted at the upper end of the cutter arm,
8. a cutter tilt arm joined pivotally at one end to the box frame for movement between a raised and a lowered position,
9. a bending plate linkage joined to the other extremity of the cutter arm for engagement with the bending plate to move the bending plate in a direction substantially normal to the leads when the bearings of the articulated cam follower engage the medial portion of the cam means moving in the activating direction,
10. locking means releasably locking the cutter tilt arm to maintain it in its lowered position,
11. an unlocking arm joined to the rocker arm to release the locking means when the rocker arm is substantially at the end of its travel, after the bearings of the articulated cam follower have passed center engagement with the cam,
12. an actuating block joined to the end of the actuating rod to engage the cutter tilt arm after release of the locking means to pivot the cutter tilt arm to its raised position for movement of the knife blade in a direction substantially parallel the leads, and
13. a squeeze block mounted on the cutter arm and a squeeze roller mounted on the box frame, the squeeze roller being positioned to engage the squeeze block as the cutter tilt arm is moved to its raised position to move the knife blade diagonally toward the leads.

4,026,334

METHOD OF CONTINUOUSLY PROCESSING METAL CORD

Paul A. Tierney, Raleigh, and Robert P. Bell, Cary, both of N.C., assignors to Monsanto Company, St. Louis, Mo.

Filed Oct. 10, 1975, Ser. No. 621,323
Int. Cl.² B21F *1/02*
U.S. Cl. 140—112 **2 Claims**



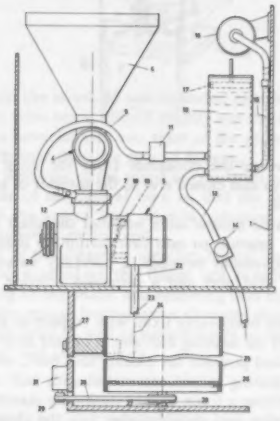
1. In a method of continuously processing spools of metal cord, including:
   a. twisting a plurality of filaments together to form cords;
   b. collecting said cords on spools in such a manner that transfer segments are provided; the improvement comprising:
   c. straightening said transfer segments;
   d. welding the transfer segment of a first spool to the transfer segment of a second spool;
   e. passing the cord continuously through a mechanical straightener; and
   f. reducing the force exerted by the mechanical straightener on the transfer segments of the cord containing the welded portion.

4,026,335

ARRANGEMENT FOR PREPARING A DOUGH-LIKE MATERIAL

Willem Hendrik Willemsen, Westervalge 83, Warffum, Netherlands

Continuation-in-part of Ser. No. 405,182, Oct. 10, 1973, abandoned. This application Apr. 22, 1975, Ser. No. 570,552
Claims priority, application Netherlands, Oct. 13, 1972, 7213867; Feb. 13, 1973, 7301992
Int. Cl.² B65B *1/04;* **B29C** *5/04*
U.S. Cl. 141—100 **2 Claims**



1. An arrangement for automatically filling cylindrical containers with a dough-like material destined for the manufacture of so-called French potato fries, croquettes and similar fried products, said arrangement comprising a tank containing a powdered material, mainly consisting of a starch-containing powder, thickening agents and binders, a continuously driven mixing device for thoroughly mixing said powdered material with a liquid delivered by a liquid feeding device, said liquid feeding device delivering such a quantity of liquid to said mixing device so that a mixture of said powdered material and the liquid in a liquid state is obtained, said mixing device having an inlet conduit means connected to said tank for the powdered material, said continuously driven mixing device being provided with a discharge conduit means feeding said mixture in liquid state to a cylindrical container to be filled, said discharge conduit having an outlet opening, the center of said outlet opening being located above said cylindrical container and lying substantially at a point on a vertical line passing through the middle of a radius midway between the center axis and the edge of said cylindrical container, said cylindrical container resting on a rotatably mounted support, adjustable driving means rotating said support, said driving means being operable to rotate said support at a speed in the range of 1–15 revolutions per minute.

4,026,336

DISPENSING APPARATUS

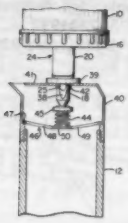
Henry J. Spies, 6165 Estes St., Arvada, Colo. 80004

Filed Nov. 24, 1975, Ser. No. 634,416
Int. Cl.² B65B *3/04*
U.S. Cl. 141—348 **14 Claims**

1. Dispensing spout apparatus for selectably permitting

passage of flowable materials therethrough from a container provided with an access opening therein comprising:

a first elongated hollow stationary member attached to a surface of the container and extending externally from the access opening in the container, one end of said member being in open communication with the interior of the container and a closure at the other end of said first member defined by a solid end cap portion defining a closure at the other end of of said stationary member, at least one port opening through the sidewall of said first member in proximity to said end cap portion and in communication with the hollow interior of said first member including a generally wedge-shaped surface portion sloping towards the container from the edge of said port closest to said closed end to the interior of said stationary member,



an elongated hollow slide member disposed in outer concentric relation to said first stationary member for slidable movement between a normally extended position closing said port and a retracted position opening said port,

stop means immovably fixed with respect to said stationary member for limiting movement of said slide member into the closed position for closing said port, and

resilient biasing means associated with said slide member for applying a force to said stationary member in a direction urging said slide member into the closed position.

4,026,337

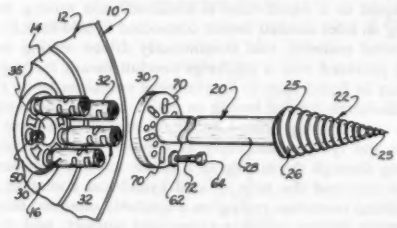
POWER TOOL

Russell H. Thackery, 2376 Brentwood Road, Columbus, Ohio 43209

Filed Apr. 19, 1976, Ser. No. 678,247

Int. Cl.² B27L 7/00; B60K 17/28

U.S. Cl. 144—193 R **4 Claims**



2. A power tool driven by a vehicle wheel hub comprising, in combination, a driven wheel hub; a plurality of fixed threaded elements on said hub; a plurality of removable threaded elements for normally attaching a wheel to the hub, each of said removable threaded elements being in threaded engagement with a respective one of the fixed threaded elements; a plurality of adapter means each of which is mounted to said hub by a respective pair of the threaded elements, each of said adapter means comprising a hollow body portion including a hub engaging end provided with a bore and an internal shoulder surrounding said bore, one of said threaded elements being extended through said bore whereby tightening of the elements clamps said shoulder and tightens the adapter on the hub, each of said adapters comprising a tool mounting end including side walls provided with slots and a longitudinal bore; a transverse bar removably disposed in said slots and including a central tool mounting threaded portion; a tool including a mounting base portion positioned on said tool mounting ends and including base holes that register with said longitudinal bores; and a plurality of tool mounting threaded elements including threaded portions fastened to said threaded portions of respective transverse bars.

4,026,338

RETRACTOR FOR ONE-WAY SCREW

Ronald G. Goebel, 3145 W. Arkansas Ave., Denver, Colo. 80219

Filed Apr. 26, 1976, Ser. No. 680,104

Int. Cl.² B25B 15/00

U.S. Cl. 145—50 A **3 Claims**

1. A retractor for intactly removing one-way screws of the type having a head with a central slot and having diametrically opposed on each side of the slot a raised shoulder and an outwardly curved camming surface, each shoulder being directly across the slot from the camming surface of the opposite side, the shoulders allowing the screw to be driven in a first direction by a standard screwdriver, and the camming surface curving from the floor of the slot for urging a standard screwdriver blade out of the slot when turned in a second and opposite direction comprising:

a. a shaft having a first end;

b. two projections on said first end of the shaft, each projection terminating in an axially extending point, the projections being laterally and angularly oppositely disposed relative to a plane passing through both projections and the axis of the shaft such that the points mutually protrude in advance of the first end when the retractor is turned to unscrew the screw, and

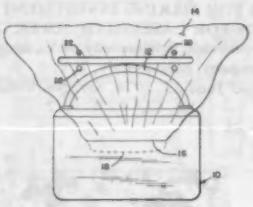
c. said two projections contacting respectively the two diametrically opposed camming surfaces of the one-way screw for impact initiated engagement through force applied axially through said shaft.

4,026,339

HANDBAG PROTECTION

Ann M. Burke, 5547 S. Sacramento, Chicago, Ill. 60629

Filed Apr. 15, 1976, Ser. No. 677,238
Int. Cl.² A45C *3/06*
U.S. Cl. 150—28 R **3 Claims**



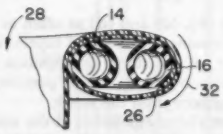
1. In combination with a handbag,
a pouch attached to a side panel thereof, and
a covering for said handbag secured to said handbag within said pouch adapted to be stored in folded condition within said pouch when not in use and unfolded and wrapped about said handbag when necessary to cover and protect said handbag,
said pouch and covering being sewn to the side panel of said handbag, and said covering having a portion disposed within said pouch and including a slot for receiving a handle connected to said handbag.

4,026,340

DEVICE FOR HOLDING A BAG MOUTH OPEN

Daryl A. Sobolik, 242 Santa Fe Drive, Walnut Creek, Calif. 94598

Filed May 28, 1976, Ser. No. 691,101
Int. Cl.² B65D *33/02*
U.S. Cl. 150—48 **8 Claims**



1. Apparatus comprising:
a flexible bag having a mouth portion; and
an endless member defining a continuous ring coiled to form at least two adjacent and overlapping, generally circular loops adapted to receive said bag mouth, the bag mouth being wrappable about the loops when the loops are rolled about each other a number of times to releasably couple the bag mouth to the member, said member provided with sufficient rigidity so that said bag mouth is held in an open position.

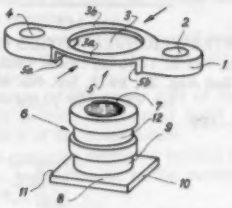
4,026,341

TWO-PART NUT

Manfred Menke, Bremen, Germany, assignor to ERNO Raumfahrttechnik GmbH, Bremen, Germany

Filed Dec. 15, 1975, Ser. No. 640,691
Claims priority, application Germany, Dec. 19, 1975, 2460061
Int. Cl.² F16B *39/00*
U.S. Cl. 151—41.74 **2 Claims**

1. A two-part nut having a socket member and a threaded member, the socket member having a central bore and two additional bores for riveting, the threaded member having a shank with internal threading, the improvement comprising:
the socket member being flat but having a groove in the central portion of the socket member on one side thereof and having a bottom and two parallel sides, said central bore traversing the bottom of the groove, thereby establishing two arcuate bars between portions of the member having said additional bores, said arcuate bars having been deformed so that said central bore has a smaller diameter transversely to the direction of arrangement of said additional bores than in said direction; the other side of the socket member being flat;



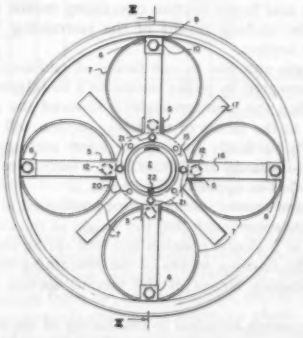
a flange on the shank of said threaded member having two parallel sides being spaced slightly less than the groove is wide as between said two sides of the groove, the flange being thinner than the groove is deep;
the outer diameter of the shank corresponding to the largest diameter of the central bore so that the shank did pass through the central bore prior to reduction of the bore to said smaller diameter; and
the shank of the threaded member having an annular precut groove adjacent the flange not resulting from any upsetting of the shank and receiving said bars, the shank above the groove having larger diameter than said smaller diameter prior as well as subsequently to insertion of the shank in said central bore.

4,026,342

SPRING WHEEL HAVING AN OVERLOAD STOP

James D. Wormley, 11010 Palmeras Drive, Sun City, Ariz. 85351

Filed Nov. 17, 1975, Ser. No. 632,535
Int. Cl.² B60B *9/04*
U.S. Cl. 152—18 **2 Claims**



1. A wheel comprising a hub element, a rim element, a plurality of substantially circular bands of flexible material spaced about the hub element interposed between and bearing against both of said elements, the axes of the bands being parallel to the axes of said elements, fastening means fastening the bands of flexible material to said elements, the bands of flexible material being spaced apart so as to at all times act freely individually and normally flexing to provide a cushion-

ing effect when the wheel rolls over rough terrain, and means within the confines of the wheel operable when such cushioning effect is not desired to rigidly connected the hub element and rim element to provide in effect a conventional wheel, said last mentioned means including substantially radial spoke-like members of different lengths selectively fastenable to the hub element in a first position in which the outer ends of the longer spoke-like members engage the rim element to rigidly connect the hub element and rim element and a second position in which the hub element and rim element are not rigidly connected and the outer ends of the shorter spoke-like members engage the rim element after predetermined flexing of the bands to limit the extent of such flexing.

4,026,343

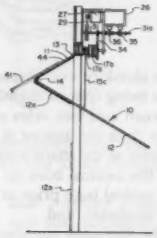
COUNTERWEIGHTED BIFOLD CLOSURES

Don E. James, 952 E. 1400 S., Orem, Utah 84057

Filed Aug. 21, 1975, Ser. No. 606,667

Int. Cl.² E05F *11/54*

U.S. Cl. 160—189 **14 Claims**



1. A counterbalanced vertically moveable bifold closure comprising two unequal rectangular sections, the first and smaller of said sections forming the upper portion of said closure said upper portion having at least one restraining bar attached thereto adapted to extend past the bottom of the upper section and overlap the lower section when the door is in a completely closed position thereby holding the door in a restrained vertical position said restraining bar having latching means at the lower end thereof,

the second and larger section being pivotally attached to the opposite side of said first section in such a manner that the pivotal movement of said second section will be in a direction opposite the pivotal movement of said first section said larger section containing means to interengage the latching means of the restraining bar of the smaller section,

cable means attached to one facing of said second section and connected by pulley means to a counterweight such that when the counterweight is lowered the cable connected to the facing of the lower section will move substantially vertically causing the lower and upper section to pivot upwardly and rotate from a vertical to a horizontal position in opposite directions,

said first and second sections being positioned in relation to the cable means such that the weight of the closure is off center in a closed position and will spring slightly open when the latching means of the restraining bars and the interengaging means of the second section are disengaged,

the cable means attached to one facing of the second section being connected by pulley means to one section of a winch having different diameters and the counterweight being connected to an adjacent section of the winch such that when the winch is rotated in one direction the counterweight cable is unwound and the counterweight is lowered and the cable means connected to the facing of the lower closure section is wound up on said winch and the bifold closure is raised, the diameter of the various portions of said winch and the weight of said counterweight means being such that the downward force exerted by the counterweight means is substantially equal to the downward force exerted by the weight of the upper and lower closure sections thereby balancing the bifold closure in any open position.

4,026,344

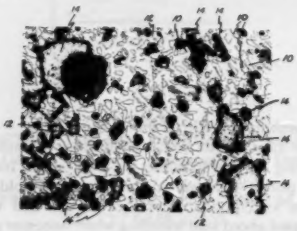
METHOD FOR MAKING INVESTMENT CASTING MOLDS FOR CASTING OF SUPERALLOYS

Charles D. Greskovich, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed June 23, 1976, Ser. No. 698,871

Int. Cl.² B22C *9/12*

U.S. Cl. 164—26 **16 Claims**



1. A method for making a shell investment mold comprising the steps of

a. preparing a slurry of a mixture of alumina flour, having an average particle size of less than about 100 microns, and silica of an average particle size less than about 1000A, the composition of the slurry averaging from 65 to 73 weight percent alumina;

b. applying a coating of the slurry mixture to a wax pattern of a predetermined shape of a metal to be cast in the mold;

c. applying a coating of an alumina stucco aggregate on the slurry coating;

d. drying the material of the slurry coating and stucco coating;

e. repeating steps (b), (c) and (d) as often as necessary to apply a predetermined number of layers, disposed one upon the other, of the slurry composition mixture and interdisposed stucco coating on the pattern;

f. removing the pattern from the mold;

g. heating the material composition of the mold to an elevated temperature of from 1700° to 1825° C in an inert atmosphere for a period of time of up to about 2 hours, and

h. reacting the alumina and silica with each other to form mullite.

4,026,345

FOUNDRY MOULDING

Charles Michael Geoffrey Wallwork, Church Cottage, Birtles Lane, Over Alderley, Cheshire, England

Filed June 26, 1975, Ser. No. 590,714

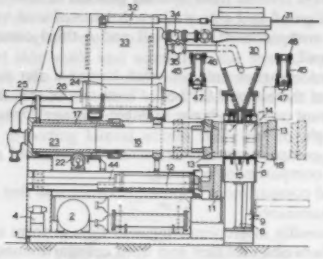
Claims priority, application United Kingdom, June 26, 1974, 28262/74

Int. Cl.² B22C *15/22*

U.S. Cl. 164—202 **12 Claims**

1. An automatic machine for the production of flaskless foundry molds, said machine comprising a slider having an aperture therethrough, said slider being movable in a direction transverse to the axis of said aperture between a first position and a second position, opposed first and second pattern plates, said pattern plates being movable into opposite sides of said opening to define therein a molding chamber, in the first position of said slider, fluid-pressure power means acting on

said first and second pattern plates to cause said movement, said power means comprising a single fluid-pressure ram assembly having first and second components movable in opposite directions on application of fluid pressure, said first component being connected to said first pattern plate and said second component being connected to said second pattern plate, sand-blowing means adapted to blow sand into said chamber to form a mold therein, and means for ejecting a mold from said opening in the second position of said slider.



4,026,346

LIQUID-COOLED MOLD FOR CONTINUOUS CASTING OF MOLTEN METAL

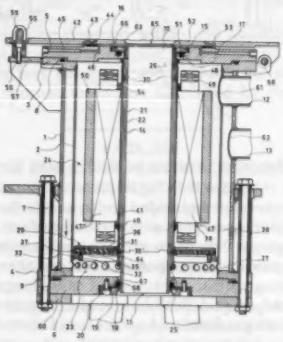
Jean Pierre Birat, and Louis Vedda, both of Metz, France, assignors to Institut de Recherches de la Siderurgie Francaise (IRSID), St. Germain-en-Laye, France

Filed June 24, 1976, Ser. No. 699,353

Claims priority, application France, June 27, 1975, 75.20225

Int. Cl.² B22D *11/04, 27/02*

U.S. Cl. 164—147 **14 Claims**



1. A liquid-cooled mold for the continuous casting of molten metal, comprising the combination of

1. a tubular mold element of non-magnetic material having two open ends and defining a passage for the casting between the open ends,
2. a tubular jacket of non-magnetic material surrounding the tubular mold element and defining an annular space therewith,
3. a tubular casing surrounding the jacket and defining a chamber therewith,
4. a liquid-tight element dividing the chamber into a lower inlet chamber for a cooling liquid and an upper outlet chamber for the liquid,
   a. the inlet and outlet chambers being adjoining but separated by the liquid-tight element,
   b. the outlet chamber extending over a substantial part of the length of the jacket,
   c. the annular space communicating at the respective ends of the jacket with the inlet and outlet chambers, respectively, whereby a film of the cooling liquid circulates through the annular space when the liquid is supplied to the inlet chamber, and
   d. the liquid-tight element comprising two annular members, a first one of the annular members being affixed to the interior wall of the tubular casing near the lower end thereof and a second one of the annular members being affixed to the exterior wall of the tubular jacket near the lower end thereof, whereby the liquid-tight element supports the jacket at its lower end, the upper end of the jacket being free of support,
5. cover means for the mold, the cover means delimiting the upper outlet chamber,
6. a bottom wall for the mold, the bottom wall delimiting the lower inlet chamber,
   a. the cover means and bottom wall having central orifices in alignment with the open ends of the tubular mold element,
7. support means at the upper end of the tubular mold element for holding the tubular mold element in the central orifice of the cover means,
8. liquid-tight centering means for holding the lower end of the tubular mold element in the central orifice of the bottom wall,
   a. the centering means providing a resilient coupling between the tubular mold element and the bottom wall,
9. an electromagnetic inductor means arranged in the upper outlet chamber and having projecting poles, the inductor means surrounding the jacket for moving the molten metal in the passage, and
10. means on exterior wall of the tubular jacket for supporting the inductor means in the outlet chamber.

4,026,347

METHOD AND APPARATUS FOR THE ALTERNATE HEATING AND COOLING OF A HEAT EXCHANGER OF A HEATING AND COOLING SYSTEM

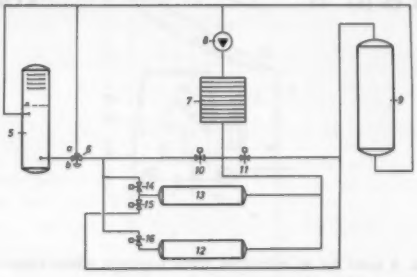
Otmar U. Schäfer, 9 Pienzenauerstrasse, Munich, Germany

Filed May 27, 1975, Ser. No. 580,700

Claims priority, application Germany, May 27, 1974, 2425589

Int. Cl.² F24D *11/00*

U.S. Cl. 165—2 **8 Claims**



1. A method of alternately heating and cooling a heat exchanger of a heating and cooling system having a boiler and a cooler, comprising: passing quantities of liquid of different temperature from the heat exchanger into at least two reservoirs respectively during the warm-up phase and cool-down phases of the exchanger, upon change from cooling to heating, passing the quantity of liquid in the reservoir having the lowest temperature to the heat exchanger for preheating the latter, and, upon the change from heating to cooling, passing the quantity of liquid in the reservoir having the highest temperature to the heat exchanger for the preliminary cooling thereof, said quantities of liquid in each warm-up and cool-down phase respectively being circulated exclusively in closed circuits, by displacement, first between the heat exchanger and one of the

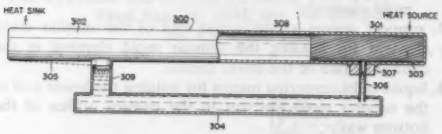
reservoirs and thereafter between the heat exchanger and another of the reservoirs, through the boiler during the warm-up phase and the cooler during the cool-down phase, the entire quantity of liquid stored during the warm-up and cool-down phase respectively being included in the subsequent cool-down and warm-up phase, respectively.

4,026,348

HEAT PIPE SWITCH

Charles Chester Roberts, Jr., Warrenville, Ill., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 6, 1975, Ser. No. 619,700
Int. Cl.² F28D *15/00*
U.S. Cl. 165—32 **4 Claims**



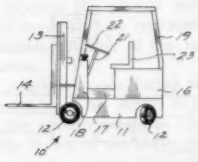
1. Thermal energy transfer apparatus comprising:
a heat pipe comprising a heat receiving end and a heat discharging end;
a quantity of working fluid;
means connected to said heat pipe for circulating said working fluid; and
means for heating at least a portion of said circulating means to inject discrete quantities of fluid in its liquid state into said heat pipe, said heating means comprising a cylindrical slug of a thermally conductive material adjacent to said heat receiving end of said heat pipe for transferring thermal energy from said heat pipe to said circulating means.

4,026,349

COWL FOR AN INDUSTRIAL ELECTRIC TRUCK

Robert E. Schaap, 12606 Shirley St., Omaha, Nebr. 68144

Filed Mar. 15, 1976, Ser. No. 667,061
Int. Cl.² B60H *1/28*
U.S. Cl. 165—41 **8 Claims**



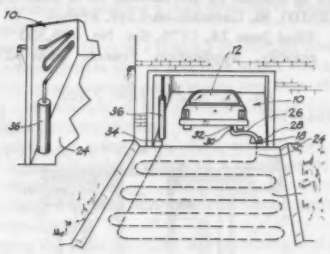
6. A cowl for an industrial truck having a wheel supported chassis, said cowl comprising:
a front wall having a bottom end secured to the chassis and a top end projecting upwardly therefrom;
spaced sidewalls, each secured on one end to said chassis and along an adjacent edge to said front wall;
a top wall secured at its edges to said front wall and said side walls;
a first compartment having an opening formed therein, said first compartment formed from a portion of said front wall, one of said side walls, a portion of said top wall, a first compartment side wall, and a first compartment base wall;
said first compartment side wall having a slot and a hole formed therein and further at least one of said compartment walls having a sealable passage formed therethrough;
a first compartment cover removably secured to said first compartment over said opening;
a third compartment spaced from said first compartment and having an opening formed therein, said third compartment formed from another portion of said front wall, the other of said side walls, a portion of said top wall, a third compartment base wall and a third compartment side wall;
said third compartment side wall having a slot and a hole formed therein and further at least one of said third compartment walls having a sealable passage formed therethrough;
a third compartment cover removably secured over said third compartment opening;
a second compartment disposed between said first and third compartments;
a first conduit interconnecting said slots to form a passageway between said first and third compartments; and
a second conduit interconnecting said slots to form a second passageway between said first and third compartments.

4,026,350

BUILT IN DE-ICING DEVICE

Sigmond Zembrzuski, 1419 Madison Ave., South Milwaukee, Wis. 53172

Filed June 19, 1975, Ser. No. 588,487
Int. Cl.² F28F *7/00*
U.S. Cl. 165—46 **2 Claims**



1. In combination, a motor vehicle, a road surface for supporting said vehicle, a de-icing apparatus comprising an elongated hollow conduit embedded under said surface and having first and second open ends exterior said surface for receiving and discharging a flow of an exhaust gas therethrough, a first flexible conduit member open at each end thereof, one end communicating with the first end of said elongated conduit, the other end of said flexible conduit communicating with heated exhaust gas from said vehicle, said second end of said elongated conduit communicating with and venting said gas to the atmosphere whereby there is continuous fresh passage of said gas from said vehicle through said conduit to said atmosphere, a vertically disposed hollow conduit portion backstream of said second open end integral with said conduit and communicating with said second open end whereby said exhaust gas is vented above the source thereof.

4,026,351

THERMAL RETENTION FOOD STORAGE CONTAINERS

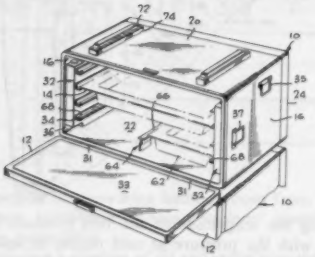
Bruno Biava, 25561 Windjamer Drive, San Juan Capistrano, Calif. 92675

Filed Aug. 13, 1975, Ser. No. 604,168
Int. Cl.² F25B *29/00*
U.S. Cl. 165—58 **14 Claims**

1. A container for storing food for moderately extended periods of time at temperatures differing from the environment external to the container comprising:
a transportable rectangular insulated box having an interior food storage region, the box comprising a pair of spaced

apart upright side panels having facing inner sidewall surfaces, a pair of parallel, facing, spaced apart lateral panels, a side base including one of the lateral panels, a rear base panel, the box being supportable on the side base and on the rear base panel;

a door, the door and the rear base panel being disposed in spaced-apart relationship generally normal to the spaced apart side walls and normal to the spaced apart lateral panels, the door pivotally coupled to the lateral panel of the side base movable from a closed position including an upright plane passing through the box, to an open position providing lateral access sufficient to transfer food trays to and from the interior food storage region;



a pair of liquid fillable thermal storage tanks removably disposed within the box, for tending to raise and lower the temperature within the food storage region above and below external ambient temperatures, the thermal storage tanks having a narrow base disposed on the side panel of the box, and laterally disposed shelf supports for supporting a plurality of trays within the box in a generally horizontal plane when the box is supported on the side base; and

at least one tray disposed within and slidably removable from the food storage region for containing food, the at least one tray being situated between the liquid fillable thermal storage tanks and supported by the shelf supports.

4,026,352

DEVICE FOR EVAPORATIVE COOLING OF METALLURGICAL UNITS

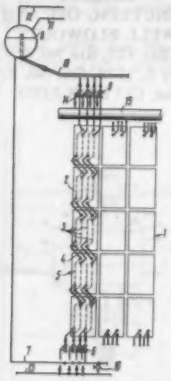
Sergei Mikhailovich Andoniev, prospekt Pravdy, 5, kv. 60; Gennady Alexandrovich Kudinov, prospekt Gagarina, 32 kv. 203; Dorina Borisovna Kutsykovich, prospekt Lenina, 39 kv. 54; Grigory Ivanovich Kasyanov, prospekt Lenina, 64-b, kv. 63; Jury Borisovich Raikovsky, prospekt Lenina, 11, kv. 34; Oleg Vladimirovich Filipiev, prospekt Pravdy, 5, kv. 4, all of Kharkov; Evgeny Zakharovich Freidenzon, ulitsa Lunacharskoga, 161, kv. 23, Sverdlovsk, and Vladimir Semenovich Pustovar, ulitsa Otakara Yarosha, 5, kv. 37, Kharkov, all of U.S.S.R.

Filed Sept. 4, 1974, Ser. No. 502,947

Int. Cl.² F28G *9/00*

U.S. Cl. 165—95 **1 Claim**

1. A device for evaporative cooling of metallurgical units which is a closed natural circulation cooling water system including: coolers accommodating several rows of vertical tubes for coding water; a separating tank adapted for separating steam from water and acting also as a water storage; a header connected individually to each inlet of said rows of the cooler tubes and adapted for supplying cooling water from said separating tank to said tubes; a header connected individually to each outlet of said rows of the cooler tubes and adapted to discharge steam-water mixture from said tubes into said separating tank; a service water supply pipeline connected also individually to each inlet of said rows of the cooler tubes; a drain pipeline connected also individually to each outlet of said cooler tube rows and adapted for draining water from said tubes; cutoff means mounted each at the inlet and outlet of said cooler tube rows and made so that with the means set to one position both the inlets and outlets of said tube rows are coupled with said header for supplying cooling water from said separating tank and with said header discharging steam-water mixture into the separating tank accordingly, while in another position they are connected to said service-water supply pipeline and to said drain pipeline, said cutoff means comprising three-way valves.



4,026,353

HEAT EXCHANGERS

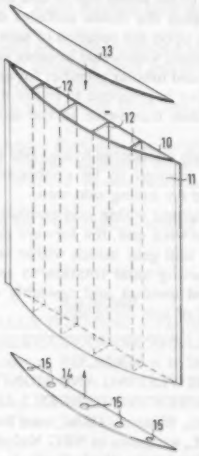
Edmund Porter Crowdy, Newcastle upon Tyne, England, assignor to Hawthorn Leslie (Engineers) Limited, Newcastle upon Tyne, England

Filed June 19, 1975, Ser. No. 588,147

Claims priority, application United Kingdom, June 20, 1974, 27416/74

Int. Cl.² F28F *13/00*

U.S. Cl. 165—135 **8 Claims**



1. A gas heat exchanger for use in an exhaust system of a slow-speed diesel engine, the heat exchanger comprising means defining a gas flow duct of polygonal cross-section and a matrix of coolant tubes housed within the duct, said duct defining means including boundary walls formed by hollow panels, each hollow panel comprising a flat plate and an arcuately curved plate joined by its edges to the flat plate, and stiffeners extending longitudinally in the space between the plates and joined to them, the panels having their flat plates bounding the the gas flow duct, and there being openings leading from within the said duct into the panels to allow

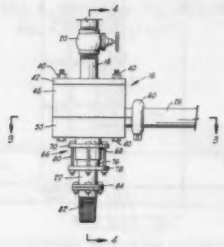
pulsations occurring within the duct to act on the sides of the flat plates remote from the gas stream.

4,026,354

APPARATUS FOR SHUTTING OFF AND CONTROLLING WELL BLOWOUTS

Melvin Burrow, P.O. Box 127, Rte. No. 1, Tryon, Okla. 74875

Filed May 5, 1975, Ser. No. 575,048
Int. Cl.² E21B *33/03*
U.S. Cl. 166—95 **8 Claims**



1. Apparatus for temporary attachment to the top of a conduit string disposed in a well bore whereby an uncontrolled fluid blowout through said conduit string can be shut off and controlled which comprises:

a housing having a top, bottom and side, a bore disposed therethrough from the top to the bottom, and a side connection formed therein communicated with said bore;

a vent sealingly attached to the top of said housing over said bore;

shutoff valve means disposed in said vent;

a tubular member having an upper end and a lower end, the upper end being rotatably and sealingly disposed within said bore of said housing with the lower end thereof extending below the bottom of said housing;

means attached to the lower end of said tubular member for sealingly gripping the inside surfaces of the top of said conduit string upon the rotation of said tubular member;

gear means disposed within said housing and attached to the upper end of said tubular member for axially rotating said tubular member in response to rotation imparted thereto from a direction transverse to the axis of said tubular member;

a conduit sealingly connected to said side connection of said housing and adapted to be connected to a source of weighted fluid for killing said well;

a drive shaft disposed within said conduit having a forward end and a rearward end, the forward end being operably connected to said gear means within said housing; and

means for imparting axial rotation to said drive shaft attached to said conduit and operably connected to the rearward end of said drive shaft.

4,026,355

METHOD FOR TESTING AND MONITORING FOR PRODUCING LANDFILL GAS

Robert D. Johnson, Duncan, Okla., and Robert S. Altmann, Los Gatos, Calif., assignors to NRG Nufuel Company, Phoenix, Ariz. and Reserve Synthetic Fuels, Inc., Newport Beach, Calif., a part interest to each

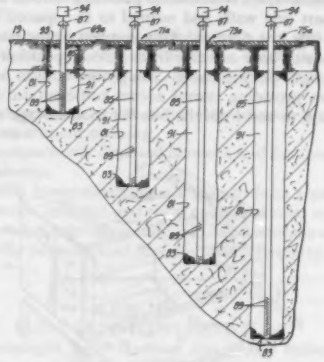
Filed June 30, 1975, Ser. No. 591,713
Int. Cl.² E21B *43/22*
U.S. Cl. 166—246 **21 Claims**

1. A method of producing landfill gas from a landfill without drawing air into the landfill in such quantities as to destroy the methane making ability of the landfill, said method comprising:

providing at least one well in the landfill;

withdrawing landfill gas through the well by maintaining the pressure within the well at a first pressure which is sufficiently low so that landfill gas from the landfill flows into the well;

monitoring the pressure at least at one selected region within the landfill, said region being outside of said one well; and



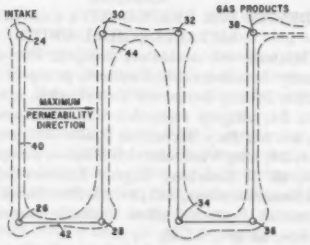
controlling the magnitude of the first pressure in accordance with the pressure at said region to substantially prevent drawing air into the landfill.

4,026,356

METHOD FOR IN SITU GASIFICATION OF A SUBTERRANEAN COAL BED

Lowell Z. Shuck, Morgantown, W. Va., assignor to The United States Energy Research and Development Administration, Washington, D.C.

Filed Apr. 29, 1976, Ser. No. 681,647
Int. Cl.² E21B *43/24*
U.S. Cl. 166—259 **1 Claim**



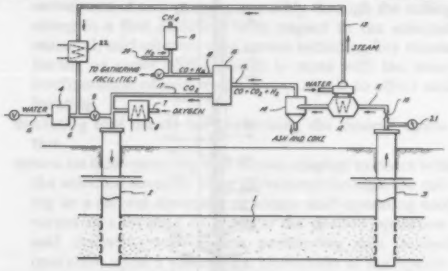
1. An improvement in the method of in situ gasification of a subterranean coal bed wherein combustion-supporting gas is introduced into the coal bed through at least one bore penetrating the coal bed to support and maintain combustion of the coal and wherein gaseous products resulting from the combustion are withdrawn from the coal bed through at least one other bore penetrating the coal bed at a location spaced from the first-mentioned bore, said improvement comprising the steps prior to the combustion of the coal of interconnecting the first and second bore by directing a beam of collimated monochromatic light beam into the coal bed with said light beam having sufficient energy to effect penetration of the coal bed and the formation of an elongated bore projecting between the first and second bore along a tortuous path defined by a plurality of straight serially-connected bore segments, and thereafter enlarging the elongated bore by fracturing the coal bed defining the walls of the elongated bore.

4,026,357

IN SITU GASIFICATION OF SOLID HYDROCARBON MATERIALS IN A SUBTERRANEAN FORMATION

David A. Redford, Fort Saskatchewan, Canada, assignor to Texaco Exploration Canada Ltd., Calgary, Canada

Filed June 26, 1974, Ser. No. 483,172
Int. Cl.² E21 *43/24*
U.S. Cl. 166—261 16 Claims



1. A method of recovering hydrocarbons from a subterranean porous, permeable viscous petroleum containing earth formation, comprising:

a. introducing a mixture of air and steam into the formation to initiate a low temperature, controlled oxidation reaction, which low temperature, controlled oxidation reaction results in recovering a portion of the hydrocarbon from the formation and leaving a solid, coke like residue on the formation mineral matrix;

b. thereafter introducing a gas which is at least 40% oxygen into the formation at a temperature of at least 600° F and a pressure of at least 200 lbs. per square inch;

c. introducing a moderating fluid selecting from a group consisting of water, superheated steam, saturated steam, and carbon dioxide, to comingle with the gas so that partial oxidation of the solid carbon material to the carbon monoxide and hydrogen occurs in the formation; and

d. recovering the carbon monoxide and hydrogen from the subterranean formation.

4,026,358

METHOD OF IN SITU RECOVERY OF VISCOUS OILS AND BITUMENS

Joseph C. Allen, Bellaire, Tex., assignor to Texaco Inc., New York, N.Y.

Filed June 23, 1976, Ser. No. 698,983
Int. Cl.² E21B *43/24*
U.S. Cl. 166—261 14 Claims

1. A method for recovering heavy viscous crude oils and bitumen from a subterranean hydrocarbon-bearing formation traversed by at least one injection well and one production well and having fluid communication therebetween comprising the steps of:

a. injecting via said injection well a hydrocarbon solvent in amounts of 0.1 to about 20% of the formation pore volume, said solvent containing a gas dissolved therein,

b. establishing in said formation a thermal sink whereby a substantial portion of said formation is heated to a temperature of at least 400° F,

c. shutting-in said wells to permit said formation to undergo a soak period,

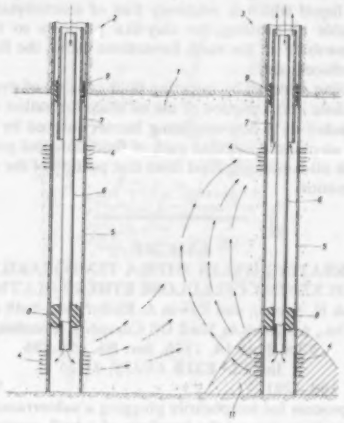
d. producing said oils and bitumen from said production well.

4,026,359

PRODUCING SHALE OIL BY FLOWING HOT AQUEOUS FLUID ALONG VERTICALLY VARIED PATHS WITHIN LEACHED OIL SHALE

Philip J. Closmann, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Feb. 6, 1976, Ser. No. 655,922
Int. Cl.² E21B *43/24, 43/26, 43/28*
U.S. Cl. 166—263 6 Claims



1. A process for producing oil from a subterranean oil shale deposit which comprises

opening at least two wells into a relatively permeable leached zone within a soluble mineral-containing subterranean deposit of oil shale;

initially injecting steam into a lower portion of the leached zone around at least one well while producing fluid from a lower portion of the leached zone around at least one other well;

when plugging near an initial producing location becomes at least imminent, initiating fluid production substantially vertically above that location;

terminating fluid production from the initial production location;

injecting hot aqueous fluid into the initial fluid production location in a volume sufficient to at least significantly increase the effective permeability to the fluid being injected; and

recovering shale oil from fluid produced from the leached zone.

4,026,360

HYDROTHERMALLY FORMING A FLOW BARRIER IN A LEACHED SUBTERRANEAN OIL SHALE FORMATION

Gary Drinkard, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Aug. 12, 1976, Ser. No. 713,759
Int. Cl.² E21B *43/24*
U.S. Cl. 166—272 5 Claims

1. A process for producing shale oil from a subterranean oil shale which comprises:

opening at least one pair of wells into fluid communication with a subterranean oil shale formation which has a composition at least substantially equivalent to that of the oil shale formations encountered in the Piceance Creek Basin to Colorado and which contains a network of relatively permeable interconnected flow channels formed by a natural fracturing or leaching of the oil shale formation;

operating the wells so that fluid flows between at least one pair of wells along a selected path within the oil shale formation;

adjusting the composition, pressure and temperature of the so-flowed fluid so that oil shale formation components within the selected path are contacted by a relatively hot aqueous alkaline liquid which hydrothermally converts them to particles of clay-like material that are distributed along the flow path;

adjusting the composition, pressure and temperature of the so-flowed fluid so that the particles of clay-like materials distributed along the flow path are contacted by an aqueous liquid which is relatively free of electrolytes and is capable of swelling the clay-like particles so that the permeability of the earth formations within the flow path is reduced; and

producing shale oil by injecting fluid capable of pyrolyzing oil shale into a portion of the oil shale formation which is bounded by a flow-confining barrier formed by at least one so-plugged selected path of fluid flow and producing shale oil-containing fluid from that portion of the oil shale formation.

4,026,361

TREATING WELLS WITH A TEMPORARILY THICKENING CELLULOSE ETHER SOLUTION

Randolph H. Knapp, and Edwin A. Richardson, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Filed June 14, 1976, Ser. No. 695,896
Int. Cl.[2] E21B *33/138, 43/26*
U.S. Cl. 166—281 **9 Claims**

1. A process for temporarily plugging a subterranean earth formation in or around the borehole of a well, comprising:

buffering an aqueous solution to retain a pH of from about 2 to 6 while a selected amount of hydroxyl ions are being added to the solution;

dissolving in the aqueous solution a reactive compound that gradually yields enough hydroxyl ions to overcome the buffering and make the solution at least substantially alkaline;

dissolving in the aqueous solution a reactive compound that reacts more slowly than the hydroxyl ion-yielding reactant but yields enough hydrogen ions to subsequently make the solution significantly acidic;

dispersing in the aqueous solution an unhydrated cellulose ether which hydrates relatively slowly in a significantly acidic aqueous liquid, hydrates relatively rapidly in a substantially alkaline aqueous liquid and, when hydrated, dissolves in an aqueous liquid to form a relatively viscous solution;

adjusting the compositions and concentrations of the materials dissolved and dispersed in the aqueous liquid relative to the time-temperature exposure of fluid flowed into contact with the subterranean earth formation and the extent and duration selected for the viscosity of a fluid temporarily plugging the earth formation; and

flowing the aqueous liquid into contact with the subterranean earth formation so that the selected extent of viscosity is exhibited for the selected time while the solution is in contact with the subterranean earth formation.

4,026,362

SUBSURFACE WELL APPARATUS HAVING IMPROVED OPERATOR MEANS AND METHOD OF USING SAME

James D. Mott, Houston, Tex., assignor to Hydril Company

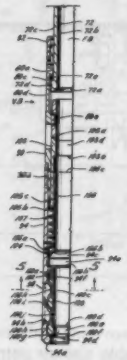
Filed May 23, 1975, Ser. No. 580,241
Int. Cl.[2] E21B *43/12*
U.S. Cl. 166—314 **17 Claims**

1. A method for controlling the flow of well fluid through the bore of a well tubing at a desired subsurface location using a controlled safety valve having a valve body and a bore closure means actuated by a movable operator means between open and closed positions for controlling flow of well fluids with the safety valve, comprising the steps of:

moving the safety valve through the bore of the well tubing to the desired subsurface location for securing with the well tubing;

securing the safety valve at the desired subsurface location in the bore of the well tubing against movement through the bore of the well tubing;

actuating the operator means carried by the safety valve for



changing the movement limits of the operator means relative to the bore closure means when the safety valve is secured with the well tubing; and

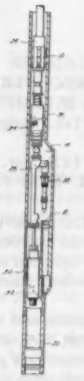
operating the bore closure means carried by the safety valve between said open and closed positions by movement of said operator means within said changed limits of movement.

4,026,363

APPARATUS AND METHOD FOR PERFORMING A DESIRED OPERATION AT A SPECIFIED LOCATION IN A WELL

John H. Yonker, Carrollton, and Phillip S. Sizer, Dallas, both of Tex., assignors to Otis Engineering Corporation, Dallas, Tex.

Filed Dec. 9, 1975, Ser. No. 639,093
Int. Cl.[2] E21B *23/02, 23/04*
U.S. Cl. 166—315 **5 Claims**



1. An apparatus for performing a desired operation in a selected mandrel in a well, the well having a tubing string and the apparatus comprising:

at least one mandrel positioned at an intermediate location

in the tubing string, one of which is the selected mandrel in which the desired operation will be performed;

at least one stop nipple having an internal recess of a selected configuration and positioned a known distance from at least one of said mandrels;

a running assembly including:

selector stop means cooperable with a selected stop nipple to positively locate said running assembly upon movement of said running assembly through the tubing string in a first direction with respect to the selected mandrel, said selector stop means including key means having an outer configuration to mate with the inner configuration of said selected stop nipple to effect said locating,

operating tool means for performing the desired operation,

means on said operating tool means adapted to coact with the selected mandrel after movement through the tubing in a second direction to locate said operating tool means in a location to perform the desired operation, said operating tool means performing said desired operation upon a subsequent movement of the operating tool means in said first direction through the tubing string after movement in said second direction and being retrievable through the tubing string after performance of the desired operation,

means connecting said selector stop means and said operating tool means with said operating tool means being spaced a sufficient distance from said selector stop means so that said selector stop means is disengaged from said selected stop nipple when said operating tool means is in a position to coact with the selected mandrel to effect operation of said operating tool means, and

pumpdown locomotive means for moving the running assembly through the tubing string;

whereby said selector stop means locates the operating tool means upon movement of said running assembly in a first direction through the tubing from which location said operating tool means may be manipulated to perform the desired operation at said selected mandrel.

5. The method of performing a desired operation in a selected mandrel in a well comprising the steps of:

running a running assembly in one direction through a well tubing string having at least one mandrel at an intermediate location therein, one of which is the selected mandrel, and at least one stop nipple positioned a determined distance from at least one of said mandrels,

engaging selector stop means associated with the running assembly with a selected stop nipple to limit further movement of the running assembly in said one direction through the well tubing string a known distance from the selected mandrel,

running the running assembly in a second direction in the well tubing string until operating tool means associated with the running assembly is in position to effect the desired operation in the selected mandrel,

operating the operating tool means within the selected mandrel to perform the desired operation including the step of moving the assembly in said first direction to perform the desired operation, and

retrieving the running assembly from the well by running the running assembly through the well tubing.

4,026,364

SOIL CULTIVATING MACHINES

Cornelis van der Lely, 7, Bruschenmain, Zug, Switzerland

Filed Oct. 15, 1975, Ser. No. 622,465

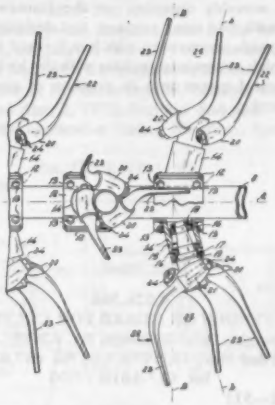
Claims priority, application Netherlands, Oct. 15, 1974, 7413513

Int. Cl.² A01B *33/02, 33/14*

U.S. Cl. 172—68 **20 Claims**

1. A soil-cultivating machine comprising a frame and a cultivating member rotatably supported on said frame, driving means connected to said member to rotate same about a first axis during operation, a plurality of soil-working means being mounted on a substantially horizontal support shaft that defines said first axis and at least one of said soil-working means being freely turnable about a further axis, said further axis intersecting said first axis.

20. A soil cultivating machine comprising a frame and a cultivating member rotatably supported on said frame, driving means connected to said member to rotate same about a first



axis during operation and said first axis extending horizontally transverse to the normal direction of travel of the machine, a plurality of tined soil working means journalled on a support shaft that defines said first axis of rotation, said soil working means being mounted in offsetting pairs around said shaft and each soil working means having a group of tines that extends away from said shaft, said plurality of soil working means being freely rotatable about corresponding axes of rotation than non-perpendicularly intersect said first axis.

4,026,365

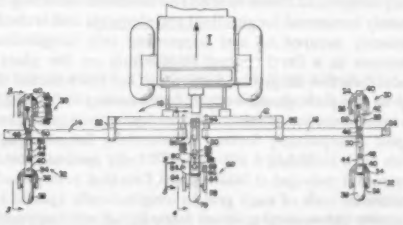
CASTER WHEEL SUPPORTED AGRICULTURAL IMPLEMENT WITH SELF-LOCKING CASTER WHEEL

Ingemar R. Andersson, Downers Grove, and Charles Boetto, Naperville, both of Ill., assignors to International Harvester Company, Chicago, Ill.

Filed Nov. 10, 1975, Ser. No. 630,110

Int. Cl.² A01B *63/22;* **B60D** *1/00*

U.S. Cl. 172—386 **11 Claims**



1. In an agricultural implement, in combination, an elongated transversely extending tool-carrying framework designed for reception of earth-working tools thereon in laterally spaced relationship, a first tractor hitch mounted on said framework in the medial region thereof for enabling the implement to be towed forwardly so that said framework advances in broadside fashion, a second tractor hitch mounted on one end of the framework for enabling the implement to be

towed sidewise so that the framework advances endwise, a plurality of ground-engaging caster wheels carried by and operatively supporting the framework, all of said wheels being of the free-trailing caster type, and means automatically effective to lock one of said caster wheels for rotation in a plane parallel to the framework when the implement is towed endwise by said second hitch, said automatically effective locking means for said one caster wheel embodying a caster yoke for said wheel, a detent plate mounted on said yoke for movement in unison therewith and having a ramp portion thereon, and a locking pin movably mounted on the framework, slidably engageable with said ramp portion, and designed for locking cooperation with an opening which is formed in said detent plate and which moves into register with the locking pin when the caster wheel moves into its position of parallelism with said framework.

4,026,366

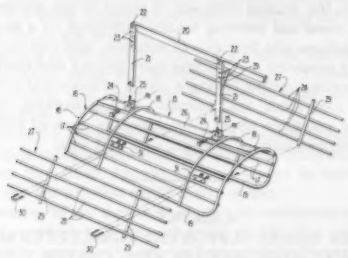
PLANT FENDER OR GUARD FOR CULTIVATORS

James M. Doughty, Rte. 2, Wingo, Ky. 42088

Filed Mar. 15, 1976, Ser. No. 667,034

Int. Cl.² A01B *17/00*

U.S. Cl. 172—511 **1 Claim**



1. A plant guard for cultivators comprising a plant guard body of inverted U-shape and having spaced vertical sides and an arcuate top and being open at its opposite ends and bottom to form a plant through passage, said plant guard body being wider at its forward end than at its rear end and tapering gradually longitudinally between such ends, said plant guard body constructed from spaced rod elements including approximately horizontal longitudinal rod elements and arched frame elements secured to and supporting said longitudinal rod elements in a fixed spaced relationship on the plant guard body, fore and aft pivotal suspension links connected with the top of the plant guard body for suspending it floatingly from an implement bar between adjacent groups of cultivator tines, a pair of separately formed substantially flat side adjustable grids each including a plurality of fixedly spaced substantially horizontal rods and at least a pair of vertical rods joined to the horizontal rods of each grid in longitudinally spaced relation whereby the vertical rods are laterally adjacent opposite sides of said arched frame elements, and clamping U-bolts and U-bolt retainer plates embracing adjacent vertical rods of said grids and sides of said arched frame elements and securing said grids to the outer sides of said inverted U-shaped plant guard body in such a way that the grids may be bodily raised and lowered on said guard body and clamped by the U-bolts in selected height adjusted positions, said horizontal rods of the grids coacting with the horizontal longitudinal rod elements of said guard body to produce variable soil grading slots in the opposite sides of said plant guard.

4,026,367

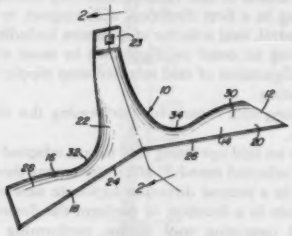
FORWARD ANGLE PLOW SWEEP WITH ELEVATED TRAILING WING EDGE

Robert C. Tibbs, 508 Johnson Drive, Cleveland, Miss. 38732

Filed June 5, 1975, Ser. No. 584,194

Int. Cl.² A01B *39/20*

U.S. Cl. 172—730 **2 Claims**



1. A plow sweep including generally horizontal elongated blade member having opposite ends and front and rear marginal edge portions, an integral mounting shank portion projecting upwardly from the longitudinal central portion of the rear marginal edge portion for attachment to and support from a tool support member, said front marginal edge portion defining a substantially horizontal edge facing forwardly, said blade member at least for the most part, being transversely rearwardly and upwardly inclined, said mounting shank portion including a lower end portion merging smoothly into the longitudinal central portion of said blade member, said lower end portion and the longitudinal central portion of said blade member, including the front marginal edge portion thereof, being forwardly convex, said front marginal edge including generally straight relatively angulated opposite end edge sections defining a forwardly opening included angle of between 135° and 170°, the central portions of the rear marginal edge portions of said blade member adjacent and on opposite sides of said mounting shank portion being downwardly depressed, into generally horizontally disposed positions, relative to the rear marginal edge portion areas of said blade member at the opposite end portion of said blade member, whereby the soil acted upon by the central one-third portion of the blade including the adjacent end portions of said edge sections, the lower end portion of said shank portion and said depressed portions will be channeled over the latter and the soil acted upon by the free end portions of said blade member outwardly of said depressed portions will be accelerated upwardly and inwardly over the channeled soil and into the central area of the path of movement of the sweep behind the mounting shank portion.

4,026,368

VEHICLE WITH IMPLEMENT CONNECTED THERETO BY STABILIZING LINKAGE

Jerrold R. Asal, Channahon, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed July 9, 1975, Ser. No. 594,398

Int. Cl.² E02F *3/76;* **F16H** *21/04*

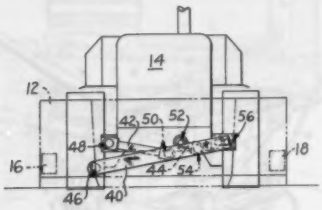
U.S. Cl. 172—809 **2 Claims**

1. In a vehicle having a massive material handling implement at one end of said vehicle by means of lift arms pivotably connected to said vehicle and extending outwardly from said end of said vehicle for raising and lowering said implement through a vertical path, said implement being subject to horizontal side-loading forces, the improvement comprising:

a. a coupler link having one end thereof pivotably connected to said implement and extending diagonally from said implement to said vehicle end,

b. first and second control links each pivotably connected at one end thereof to said vehicle end and pivotably connected at the other end thereof to said coupler link, said

first and second control links being of substantially different lengths and in general parallel relation with each other, the pivotable connections of the two control links to said vehicle being on a horizontal line and spaced further apart than the pivotable connection of said control links to said coupler link, the pivotable connections of said control links to said coupler link being both between the ends of said coupler link, and



c. means on said vehicle end and on the same horizontal line as said pivotable connections of said control links to said vehicle, said means being engaged with the other end of said coupler link for permitting horizontal movement of said other coupler link end relative to said vehicle while restraining vertical movement of said other end of the coupler link relative to said vehicle.

4,026,369

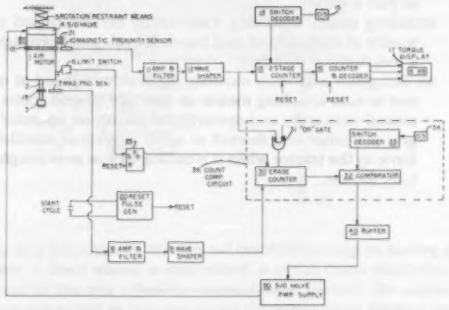
YIELD TORQUE APPARATUS

Walter C. Vliet, Landing, N.J., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Oct. 6, 1975, Ser. No. 619,656

Int. Cl.² E21C *5/00*

U.S. Cl. 173—12 **9 Claims**



1. A wrenching apparatus for simultaneously tightening a fastener and sensing the stress-strain relationship in the fastener to determine when yield has occurred in the fastener unit comprising:

a wrench including a wrench body for tightening a fastener having its rotational and torque output on a wrench spindle;

a wrench mounting means for allowing at least some rotation of the wrench body in reaction to the torque output on said wrench spindle;

a resilient means for restraining the rotation of said wrench body;

a first measurement means for determining the magnitude of restraint required to prevent rotation of said wrench body and produce a torque pulse signal in response to an increment of said magnitude of restraint;

a second measurement means for determining the rotation of said wrench spindle and producing a rotation pulse signal in response to an increment of spindle rotation;

means for receiving and totaling the number of rotation pulse signals;

means for receiving the torque pulse signal and for cancelling the total number of rotation pulse signals in response to a torque pulse signal received; and

means for shutting off said wrench in response to a preselected total of said rotation pulse signal having been exceeded.

4,026,370

DRIVING TOOLS

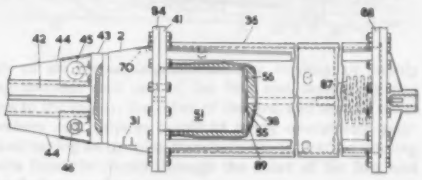
Keith Foster, Birmingham, England, and Philip Smith, Glasgow, Scotland, assignors to Secretary of State for Industry in Her Britannic Majesty's Government of the United Kingdom of Great Britain & Northern Ireland, London, England

Filed Apr. 2, 1975, Ser. No. 564,624

Claims priority, application United Kingdom, Apr. 3, 1974, 14888/74

Int. Cl.² E21B *11/02*

U.S. Cl. 175—20 **10 Claims**



1. A driving tool comprising a casing having an axis intended for use in a vertical position; a housing block having an upper and a lower face, the upper face being attached to the lower end of said casing; a ground engageable member attached to the lower face of said housing block; a drive mass freely slideable within said casing along said axis and having a lower face which is coactable with the upper face of said housing block for driving said housing block and said ground engageable member downwardly; a piston, slideable on said axis and captive within an open-ended axial sleeve extending from the upper face of said housing block into said casing and intrudable into a corresponding recess in the lower face of said drive mass, said piston being coactable with said drive mass for projecting said drive mass away from said housing block upwardly within said casing; and a hydraulic control system within said housing block for generating from a constant pressurised fluid supply repeated hydraulic pulses each operative upon said piston for driving said piston upwardly within said axial sleeve thereby impacting said drive mass, whereupon said drive mass slides upwardly in said casing until all upward momentum is expended and thereafter falls downwardly within said casing finally impacting said housing block.

4,026,371

PILOT HEAD FOR LAYING PIPES IN THE GROUND

Hiroshi Takada, Yokohama, and Yasuo Kawada, Isehara, both of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Dec. 22, 1975, Ser. No. 643,118

Int. Cl.² E21B *47/02*

U.S. Cl. 175—45 **9 Claims**

1. A pilot head for laying pipes in the ground comprising:

a pilot head casing;

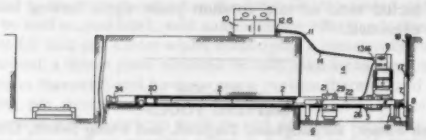
an expandable and contractable pilot jack disposed within said casing;

a pilot jack head secured to a front end of said pilot jack for consolidating soil;

sealing means for preventing water or soil from entering said casing, said sealing means being provided between a front end of said casing and said pilot jack;

pivoting means for pivoting said pilot jack in any selected

direction in a plane normal to the central axis of said pilot head, said pivoting means including a first pivoting cylinder, and a second pivoting cylinder circumferentially spaced in phase from said first cylinder by 90° said first



and second cylinders being positioned at a rear portion of said casing, and;

electromagnetic valve means for remotely controlling said pivoting means, said electromagentic valve means being disposed in the rear portion of said casing.

4,026,372

DRILL BITS

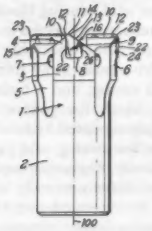
John Raymond Hampson, Bolton, England, assignor to Padley & Venables Limited, Great Britain

Continuation of Ser. No. 552,886, Feb. 25, 1975, abandoned. This application May 17, 1976, Ser. No. 686,820

Claims priority, application United Kingdom, Mar. 21, 1974, 12600/74

Int. Cl.² E21C *13/01*

U.S. Cl. 175—410 **31 Claims**



1. A rotary percussive drill bit comprising a body having a longitudinal axis, a side face and an end face; cutting inserts mounted in the body and projecting axially forwardly from the end face; each insert having a substantially flat leading face which lies substantially in a plane extending parallel to the longitudinal axis to provide a substantially zero rake angle, all such leading faces being similarly oriented to face towards the intended direction of rotation of the bit; and wherein each said leading face projects axially forwardly of the body end face to communicate at a leading cutting edge with a clearance face of its insert, which clearance face extends substantially transversely of the bit and is substantially flat to provide a substantially straight leading cutting edge on its respective insert, the arrangement being such that during rotary percussive drilling wear tends to take place over the clearance face and thus the leading cutting edge tends to be preserved, and wherein the leading cutting edge of at least one insert extends radially outwardly beyond the side face of the bit body for providing clearance cutting.

4,026,373

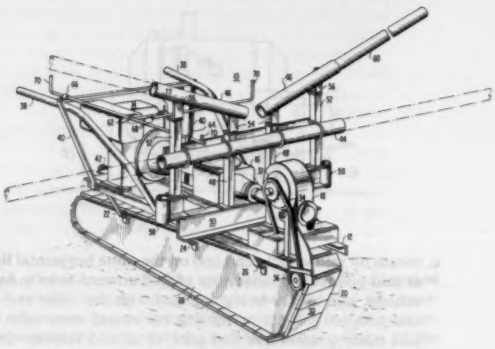
HILL PLOWER

Eleuterio Ruiz Martinez, Luis Celis Perez St. Num. 158, Fajardo, P.R. 00648

Filed Feb. 27, 1976, Ser. No. 662,227

Int. Cl.² B62D *37/02, 55/00*

U.S. Cl. 180—9.22 **2 Claims**



1. A pedestrian type farm tractor for pulling a plow over rough or hilly terrain comprising:

a frame,

a longitudinally extending traction belt secured to said frame for propelling it in a longitudinal direction,

said belt having a width substantially less than the width of said frame and an effective length longitudinally of the frame of substantially the same order of magnitude as said frame,

motive means on said frame for driving said traction belt,

means at the rear of said frame for engagement with means to pull a plow.

attaching means extending transversely outwardly and upwardly at each side of said frame for releasably engaging a longitudinal member,

an elongated extension member releasably engaged at one end to said attaching means on one side of said frame to extend outwardly and upwardly to permit an operator to grip the other end thereof to apply a vertical stabilizing force to the tractor while it is pulling a plow over rough or hilly terrain.

4,026,374

BICYCLE WITH AN INTERNAL COMBUSTION ENGINE

Seishi Miura, Wako, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

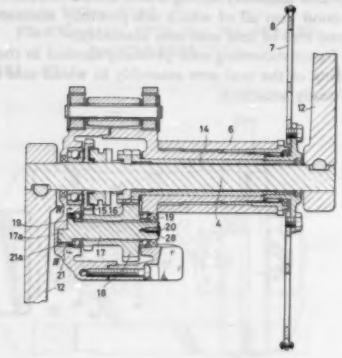
Filed Apr. 9, 1976, Ser. No. 675,291

Int. Cl.² B62D *61/02;* **B62M** *7/02*

U.S. Cl. 180—33 C **9 Claims**

1. In a bicycle having a frame, a front wheel, a rear wheel, a pedal crank shaft connected to the rear wheel for manual drive thereof, and an internal combustion engine connected to the rear wheel for power drive thereof, an improvement comprising a gear train interposed between said pedal crank shaft and said rear wheel, a rotatable supporting shaft, means on said rotatable supporting shaft for frictionally engaging said gear train to drive said shaft, and means coupled to said shaft for throttle control of the engine, said means for frictionally

engaging the gear train being loosely mounted on the supporting shaft for causing frictional engagement after a pre-determined torque is transmitted by the pedal crank shaft to the rear wheel.

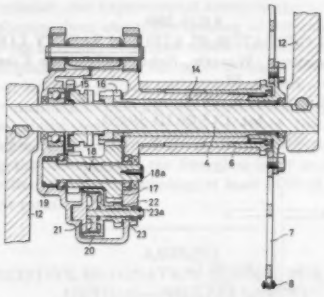


4,026,375

BICYCLE WITH AN INTERNAL COMBUSTION ENGINE

Seishi Miura, Wako, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 9, 1976, Ser. No. 675,293
Int. Cl.² B62K *11/00*
U.S. Cl. 180—33 C **9 Claims**



1. In a bicycle with an internal combustion engine having a frame, a front wheel, a rear wheel, a pedal crank shaft connected to the rear wheel for manual drive thereof, the engine being connected to the rear wheel for power drive thereof, an improvement comprising first means for producing an output related to drive speed imparted to the rear wheel by the pedal crank shaft, second means for producing an output related to drive torque imparted to the rear wheel by the pedal crank shaft, and third means responsive to the outputs of said first and second means for controlling a throttle member of the engine.

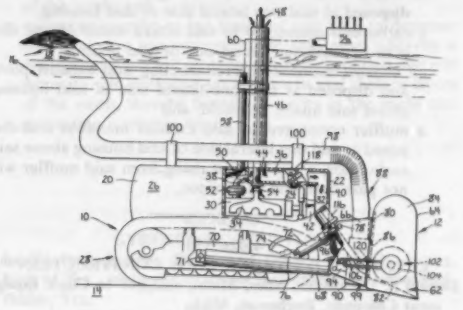
4,026,376

UNDERWATER TRACTOR AND INTAKE AND EXHAUST MEANS THEREFOR

James E. Gee, Washington, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Division of Ser. No. 444,317, Feb. 21, 1974, Pat. No. 3,905,137. This application Apr. 2, 1975, Ser. No. 564,239
Int. Cl.² B60K *13/00*
U.S. Cl. 180—54 A **4 Claims**

1. In a vehicle having a motor requiring an air supply for operation thereof and exhausting gas from a manifold, a first tubular member associated with said vehicle and extending therefrom, and only a second tubular member disposed within the bore of the first tubular member and extending therewithin, the operational air supply traveling through one of the first and second tubular members to the motor, the exhaust gas traveling from the manifold of the motor through the other of the first and second tubular members, the motor requiring a supply of air for cooling thereof, the cooling air supply traveling through said one of the first and second tubular members to the motor, the other of the first and second tubular members and exhaust manifold being operatively associated and having an opening therebetween so that the cooling air travels from the motor through the other of the first and second tubular members.

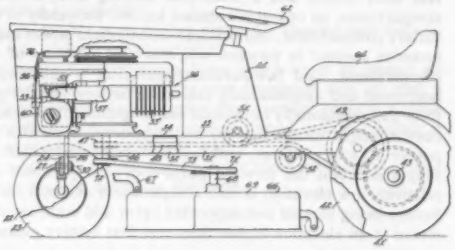


4,026,377

VERTICAL CRANKSHAFT ENGINE HAVING LONGITUDINALLY OPPOSED CYLINDERS

Kenneth R. Jones, Thiensville, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Dec. 2, 1975, Ser. No. 636,826
Int. Cl.² B60K *5/06*
U.S. Cl. 180—64 R **2 Claims**



1. In a tractor having longitudinally spaced front and rear wheels, the combination comprising:

a longitudinally elongated main frame supported at its longitudinally opposite ends by said front and rear wheels and

an internal combustion engine disposed substantially above said main frame having

a housing structure rigidly secured to said main frame and including walls defining a crankcase cavity and a pair of opposed cylinders with vertically spaced parallel axes lying in a vertical longitudinal plane;

a piston in each cylinder;

a vertically disposed crankshaft rotatably mounted in said housing structure having an output shaft portion extending from the bottom side of said housing structure and a pair of vertically spaced crank arms disposed in said crankcase cavity;

connecting rods interconnecting said crank arms and pistons;

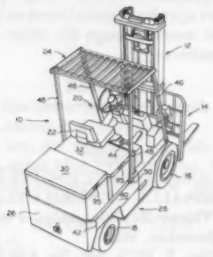
wall means defining a cylinder intake port in one lateral side of said housing structure for each of said cylinders;
wall means defining a cylinder exhaust port in said one lateral side of said housing structure for each of said cylinders, said exhaust ports being disposed above said intake ports, respectively;
an intake manifold interconnecting said intake ports and disposed at said one lateral side of said housing;
a carburetor connected to said intake manifold and disposed at said one lateral side of said housing;
an exhaust manifold interconnecting said exhaust ports and disposed at said one lateral side of said housing above said intake manifold; and
a muffler connected to said exhaust manifold and disposed at said one lateral side of said housing above said carburetor, whereby heat rising from said muffler will not pass over said carburetor.

4,026,378

ELECTRIC LIFT TRUCK BODY CONSTRUCTION

Donald J. DePriester, Niles, Mich., assignor to Clark Equipment Company, Buchanan, Mich.

Filed Nov. 28, 1975, Ser. No. 636,246
Int. Cl.² B60R *18/02*
U.S. Cl. 180—68.5 **13 Claims**



1. In an electric lift truck of the sit-down rider type having rear steer wheels and a transverse steering axle, a battery compartment, an operator's station located forwardly of said battery compartment, and first and second main power source batteries located in forward and rearward portions of said compartment, said compartment including a substantially horizontal and longitudinally extending battery support platform and substantially horizontal and longitudinally extending counterweight means located and supported upon the rear portion of said platform, said first battery being located and supported upon the forward portion of said platform at a relatively low elevation in said compartment and said second battery being located and supported upon said counterweight means at an elevation higher than said first battery means.

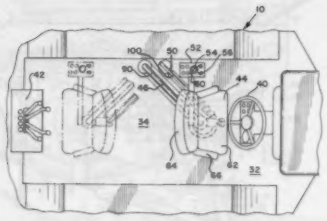
4,026,379

MULTI-POSITIONAL SEAT HAVING A FOLLOWING INSTRUMENT PANEL

Robert C. Dunn, Lockport, and Joseph M. Jania, Bolingbrook, both of Ill., assignors to International Harvester Company, Chicago, Ill.

Filed Nov. 26, 1975, Ser. No. 635,501
Int. Cl.² B60N *1/02*
U.S. Cl. 180—77 S **8 Claims**

1. In a vehicle having implements attached to both ends thereof, an assembly for mounting an instrument panel and a rotatable seat for movement between two longitudinally spaced work stations, said seat being rotatable independently of said control panel, the assembly comprising:
a flanged sleeve located in the floor structure of said vehicle;
a seat arm assembly having one end pivotally carried by said flanged sleeve and a second end terminating as a flanged housing having a verticle bore;
a panel arm assembly having a first arm, a central body, and a second arm all of which are pivotally mounted to the second end of said seat arm assembly;
a seat frame mounting axle pivotally carried in the flanged housing of the seat arm assembly to which said seat may be fixedly attached;



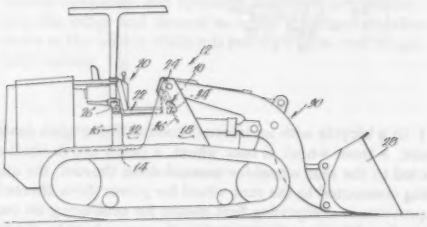
a sleeve housing is located in the floor structure of said vehicle adjacent to said flanged sleeve;
a control arm having one end pivotally carried by said sleeve housing and a second end of said control arm pivotally retained on the first arm of said panel arm assembly;
a panel carried on said second arm of said panel arm assembly.

4,026,380

TILTING OPERATOR PLATFORM SAFETY LOCK

Gary D. Blomstrom, Waverly, Nebr., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Dec. 8, 1975, Ser. No. 638,581
Int. Cl.² B62D *39/00*
U.S. Cl. 180—89.12 **6 Claims**



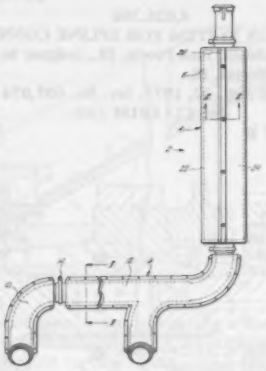
1. In a vehicle having a frame, a cab overlying the frame, and means for mounting the cab for pivotal movement relative thereto between an operating position and a tilted position, a locking mechanism to prevent lowering of the cab from a selected tilted position, comprising:
an elongated support having an end mounted on one of the frame and the cab for movement relative to the other of the cab and the frame, in a predetermined path, when the cab is moved on the frame, said support having a shoulder remote from said end;
a latch movably mounted adjacent said path on the other of the cab and the frame and including a latch surface movable into and out of said path, said latch surface, when in said path, engaging said shoulder to preclude relative movement of said support and said latch in at least one direction; and
means for causing such latch surface to move into said path upon predetermined relative movement between said cab and said frame.

4,026,381

EXHAUST SYSTEM COVER ASSEMBLY

Challie Conley, Fountain Valley, Calif., assignor to Hallamore Inc., Fountain Valley, Calif.

Filed Sept. 15, 1975, Ser. No. 613,630
Int. Cl.² F01N 7/16
U.S. Cl. 181—62 4 Claims



1. In an exhaust system for attachment to a diesel engine and the like having an exhaust conduit attached to the engine manifold and an exhaust muffler housing operatively attached to the conduit, the improvement comprising:

an asbestos sheet about the housing of the exhaust muffler having a density of at least .00044 pounds per cubic inch;

a fiberglass layer about the asbestos sheet having a density of at least 7.5 pounds per cubic foot; and

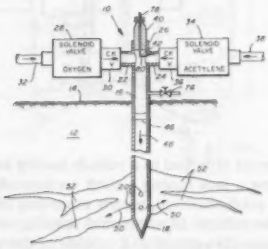
cover means for reducing the exhaust sound produced by the engine including a pair of rigid fiberglass shells adapted to be mounted about the muffler and connected together to compress the fiberglass layer to surround the muffler, the shells including at least 60% of a fire retardant resin.

4,026,382

REPETITIVE DETONATION SEISMIC SURVEYING METHOD AND APPARATUS

Harold S. Field, and Donald K. Mitchell, both of Tulsa, Okla., assignors to Daniel Silverman, Tulsa, Okla.

Continuation of Ser. No. 281,716, Aug. 18, 1972, abandoned. This application Oct. 4, 1974, Ser. No. 512,035
Int. Cl.² G01V 1/12, 1/04
U.S. Cl. 181—117 16 Claims



1. Apparatus for generating seismic waves in the earth comprising:

a. an elongated pipe of small cross section open at its lower end, the upper end of said pipe being closed, said lower end of said pipe adapted to be driven into the shallow layers of the earth;

b. means to introduce into the inside of said pipe at said upper end thereof an oxygen containing gas and a combustible gas; said combustible gas forming an explosive mixture with said oxygen-containing gas whereby part of said explosive gas mixture will flow into the shallow layers of the earth; and

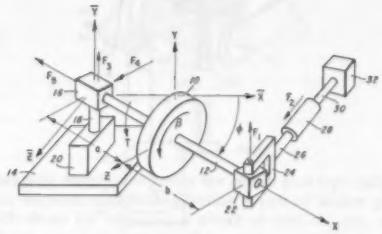
c. means connected to the inside of said pipe to detonate said explosive gas mixture inside said pipe; whereby a detonation wave will progress down said conduit and will detonate said explosive gas mixture in said shallow layers of the earth, thereby forming a cavity in the earth and generating a seismic wave.

4,026,383

GYROSCOPIC VIBRATOR

John W. Bedenbender, Plano, and Gilbert H. Kelly, Irving, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Nov. 4, 1974, Ser. No. 520,393
Int. Cl.² G01V 1/14
U.S. Cl. 181—121 25 Claims



1. An apparatus for initiating seismic waves in the earth by exerting forces on the earth along a predetermined axis, said apparatus comprising:

a. a rotatable mass having means for causing said mass to spin about a rotational axis,

b. means for applying a force which tends to impart an angular displacement to said rotational axis, at least a component of said angular displacement being in a plane perpendicular to said predetermined axis to produce a gyroscopic force couple, and

c. means for coupling at least one force component of said gryoscopic couple to the earth.

4,026,384

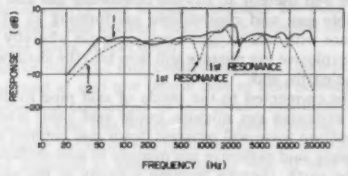
RECONSTITUTED MICA ACOUSTIC DIAPHRAGM

Kenzabro Yamachika, Nakama; Ituro Sonoda; Ichimatsu Kishimoto, both of Kitakyushu, and Masaaki Matsushima, Nakama, all of Japan, assignors to Okabe Mica Co., Ltd., Japan

Filed Nov. 24, 1975, Ser. No. 634,736
Claims priority, application Japan, Dec. 17, 1974, 49-144108
Int. Cl.² G10K 13/00; H04R 7/00
U.S. Cl. 181—167 4 Claims

1. A loudspeaker diaphragm made of a mica sheet and consisting essentially of a number of scaly flakes with a size of 8 to 400 mesh of a mica selected from the group consisting of natural mica, synthetic mica and partially dehydrated natural mica and an organic polymeric binder, said scaly mica flakes having their cleavage planes (001 plane) oriented parallel to

the surface of the mica sheet and being bonded to one another through said binder at their cleavage planes (001 plane), and



said mica sheet having a density of 1.3 to 2.3 g/cm³ and a Young's modulus of 6×10^{10} dyne/dm² to 3×10^{12} dyne/cm².

4,026,385

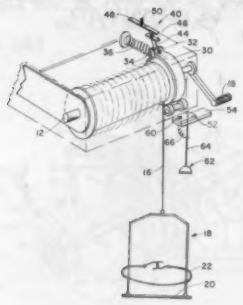
LADDERLESS SAFETY ESCAPE DEVICE

Rao K. Murukurthy, 413 High St., Monroe, N.Y. 10950

Filed Jan. 19, 1976, Ser. No. 650,312

Int. Cl.² A62B *1/10*

U.S. Cl. 182—75 **4 Claims**



1. A ladderless safety excape device comprising in combination:

a frame;

a cable drum mounted rotatably in said frame;

a cable wound upon said drum and having means secured to the free end thereof for the support of a person;

a braking mechanism for said drum for controlling the rate at which said cable is unwound to thereby regulate the rate of descent of the person, said brake mechanism including an outer element concentrically positioned about said drum and having free end portions extending in a generally radial direction in spaced relation to each other, spring means adapted to normally bias said free end portions towards each other to thereby apply a braking force to said cable drum;

a brake control mechanism adapted to selectively operatively connect and disconnect said braking mechanism and said cable drum, incuding means for automatically connecting said braking mechanism and cable drum in the event said cable drum begins to unwind without being operatively connected to said braking mechanism, said automatic connecting means including a brake cam mounted between said spaced end portions of said braking mechanism pivotable between a first position engageable with said end portions to urge same apart against the bias of said spring means to remove the braking force from said cable drum and a second position out of engagement with said end portions to thereby permit said spring means to bias said outer concentric element radially inwardly and thereby apply said braking force to said cable drum, lever means being connected to said brake cam and adapted to be shifted into the path of rotation of a rewind handle for said drum when said brake cam is in its said first position and to cause said cam to pivot into its said second position upon engagement by the rewind handle upon rotation of said cable drum;

manually operable cable drum control means for selectively locking said drum against rotation;

and a rewind handle connected to said cable drum for rewinding of the cable thereon.

4,026,386

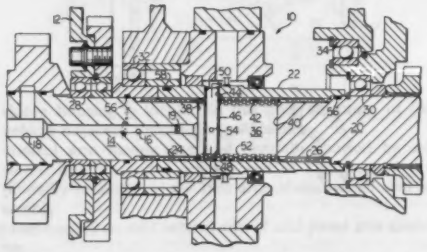
LUBRICATION SYSTEM FOR SPLINE CONNECTION

Henry T. Therkildsen, East Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Aug. 22, 1975, Ser. No. 607,074

Int. Cl.² F01M *1/06*

U.S. Cl. 184—7 R **7 Claims**



1. In a mechanism having an annular collar member defining an interior diameter attached to a first shaft by a loose spline connection, a lubricant system comprising means forming a chamber with said first shaft and the interior wall of said collar member, wherein the improvement comprises a radially directed tubular standpipe mounted in a bore in said collar member interior wall communicating said chamber with the exterior of said collar, wherein said standpipe extends inwardly more than half the diameter from its mounting point on said collar interior wall so that the amount of lubricant in said chamber is thereby controlled.

4,026,387

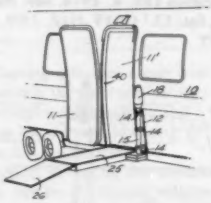
WHEELCHAIR LIFT

Vasco O. Abreu, 315 Gardner St., New Bedford, Mass. 02740

Filed Jan. 12, 1976, Ser. No. 648,467

Int. Cl.² B60P *1/44*

U.S. Cl. 187—9 R **5 Claims**

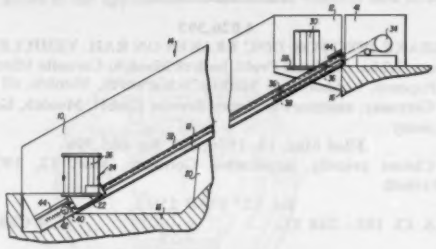


1. A lift device attached to a vehicle having an access opening comprising a jack having a shaft reciprocably movable in generally an axial direction, means mounting said jack on the outside of the vehicle adjacent said opening with the axis of said shaft generally vertical and outside of the vehicle, means to move said shaft in either upward or downward axial direction, a platform of a size to receive a wheelchair pivotally mounted solely at the end portion of said shaft for swinging about the axis of said shaft through at least 90° from a stored position beneath said vehicle to an operating position at generally right angles to and outside the vehicle.

4,026,388
INCLINED LIFT

Denis C. Creissels, 23, Bld. Marechal Leclerc, 38 Grenoble, France

Filed May 19, 1976, Ser. No. 687,865
Claims priority, application France, May 23, 1975, 75.16255
Int. Cl.² B66B 7/02, 5/16
U.S. Cl. 187—14 4 Claims

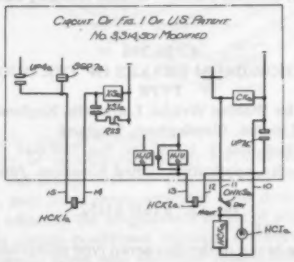


1. A transportation system comprising a first carriage having freely rotatable support rollers, a passenger compartment carried by said first carriage, a second carriage having freely rotatable support rollers, a counterweight secured to said second carriage, a straight track beam comprising two spaced girders each girder comprising two superposed I sections having webs extending substantially in a vertical plane and side flanges arranged on the opposite sides of the webs to form runways for said first and second carriages, running on the superposed flanges of said I sections, a downhill and an uphill station, said track beam being inclined and extending between said stations, supporting pylons spaced lengthwise to support said track beam, a carriage haulage device comprising a motor driven return pulley located in one of said stations and a haulage cable passing over said return pulley and having opposite ends each secured to one of said carriages, said runways being arranged to permit running in opposite directions and crossing of said carriage along said track beam.

4,026,389
ELEVATOR CAR PASSENGER SECURITY SYSTEM

John E. Magee, 191 Forest Blvd., Ardsley, N.Y. 10502

Filed Dec. 11, 1975, Ser. No. 639,850
Int. Cl.² B66B 1/16
U.S. Cl. 187—29 R 4 Claims

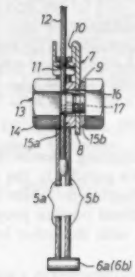


1. In an elevator system comprising at least one elevator car operating between a plurality of landings, said car having car call registering means therein for registering calls for service to said landings by a passenger therein, landing call registering means at a plurality of said landings for registering calls for service at said landings, normal control circuit means comprising car call responsive means controlled by said car call registering means for normally causing said car to stop at landings for which car calls are registered and landing call responsive means controlled by said landing call registering means for normally causing said car to stop at landings for which landing calls are registered, the combination therewith of control modifying means controllable by said car call registering means and connecting means for selectively connecting said control modifying means to said landing call responsive means for preventing response of the latter upon operation of said car call registering means.

4,026,390
GUY WIRE SUSPENSION DEVICE FOR CENTER-PULL TYPE CALIPER BRAKES FOR BICYCLES

Kiyokazu Yoshigai, Higashi-Osaka, Japan, assignor to Yoshigai Kikai Kinzoku Kabushiki Kaisha, Osaka, Japan

Filed Jan. 28, 1976, Ser. No. 652,993
Claims priority, application Japan, Sept. 6, 1975, 50-123045
Int. Cl.² F16C 1/12; B62L 1/02
U.S. Cl. 188—24 4 Claims



1. A guy wire suspension device for center-pull type caliper brakes for bicycles said brakes having a pair of arches provided with shoes for engaging a wheel of said bicycle, said arches being urged to a normally spread condition during nonbraking and adapted to brake the wheel by pulling the inner wire of a Bowden cable connected to a brake lever and coupled to said device, said device comprising:

a. at least two guy wires each of said guy wires having each end connected to one of said arches;

b. a suspension unit including at least one groove for receiving said at least two guy wires; and

c. a Bowden cable inner wire fixing unit coupled to said suspension unit for connecting said inner wire to said suspension unit, wherein said inner wire extends vertically into said suspension unit with at least one of said guy wires being positioned on each side of said inner wire and wherein said inner wire fixing unit fixes said inner wire in said suspension unit at a position below the highest level at which said guy wires are received in said suspension unit.

4,026,391
FLUID PRESSURE OPERATED DISC BRAKE WITH PISTON EXPANSION MEANS TO COMPENSATE FOR BRAKE SHOE WEAR

Erich Reinecke, Beinborn, Germany, assignor to WABCO Westinghouse GmbH, Hannover, Germany

Filed Feb. 9, 1976, Ser. No. 656,439
Claims priority, application Germany, Feb. 28, 1975, 2508771
Int. Cl.² F16D 65/56
U.S. Cl. 188—71.9 9 Claims

1. A fluid pressure operated disc brake unit having at least one brake shoe arranged to be actuated into friction braking engagement with a rotor member of the brake unit comprising:

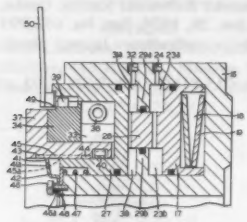
a. a brake cylinder device;

b. an annular actuating piston operative in said brake cylinder device responsive to the supply of fluid pressure thereto to apply at least one brake shoe to the rotor member;

c. a return spring acting on said actuating piston in a direction to move the piston to release position responsive to venting of the fluid pressure supplied thereto during a brake application;

d. a thrust ring carried by said actuating piston for relative axial movement therewith, said thrust ring being engageable with said at least one brake shoe; and

e. a slack adjusting mechanism operatively disposed between said actuating piston and said thrust ring comprising:



i. a pair of adjusting members independently rotatable about an axis parallel to the axis of said actuating piston, said adjusting members each having a frontal face with an inclined portion projecting therefrom so as to interfit one with the other in contiguous relationship; and

ii. spring means disposed in a space between the end walls formed by said inclined portions of the respective members for effecting rotation of one of said members relative to the other in a direction to cause said inclined portions to ride up on each other and thereby increase the axial dimension of said slack adjuster mechanism.

4,026,392

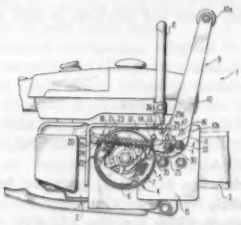
SNAP-ACTING OVER-CENTER CHAIN SAW SAFETY BRAKE AND METHOD OF OPERATION THEREOF

Sidney Hirschkoff, Los Angeles, Calif., assignor to McCulloch Corporation, Los Angeles, Calif.

Division of Ser. No. 515,046, Oct. 15, 1974, Pat. No. 3,934,345. This application Jan. 20, 1976, Ser. No. 650,733

Int. Cl.² B60T *13/04*

U.S. Cl. 188—166 **12 Claims**



1. A chain saw safety brake comprising:

brake means including a brake element and spring biasing means;

brake actuating means directly movably engaged with said brake means; and

actuation accelerator means operably interposed between said brake actuating means and said brake means and operable to effect a faster rate of brake actuation than would result from said movable engagement between said brake actuating means and said brake means;

said spring biasing means being operable to

bias said brake actuating means toward a nonactuating position with a first biasing force, and

bias said brake actuating means toward an actuating position with a second biasing force which is higher than said first biasing force.

4,026,393

BRAKE DISC FOR DISC BRAKES ON RAIL VEHICLES

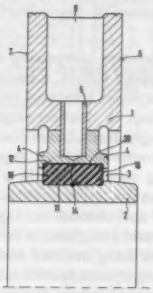
Hans Gebhardt; Franz Prahl, both of Munich; Corneliu Mircea Popescu, Lohhof, and Mathias Schörwerth, Munich, all of Germany, assignors to Knorr-Bremse GmbH, Munich, Germany

Filed Mar. 10, 1976, Ser. No. 665,396

Claims priority, application Germany, Mar. 12, 1975, 2510640

Int. Cl.² F16D *65/12*

U.S. Cl. 188—218 XL **4 Claims**



1. A brake disc for disc brakes on rail vehicles comprising a hub, an annular braking element having an inner peripheral surface spaced radially from said hub, an intermediate member connected to the inner peripheral surface of said annular element, there being a pair of radially opposed annular grooves in said hub and intermediate member, a plurality of blocks of resilient material in said opposed grooves and uniformly distributed about the periphery thereof to interconnect resiliently said hub and intermediate member, said blocks being pre-stressed and fully occupying said grooves in their axial directions, and a layer of heat-inhibiting material in the annular groove of said intermediate member to inhibit heat flow from said annular element to said resilient blocks.

4,026,394

VEHICLE SHOE-DRUM BRAKES OF THE DUO-SERVO TYPE

Andrew Charles Walden Wright, Lapworth, England, assignor to Girling Limited, Birmingham, England

Filed June 5, 1975, Ser. No. 584,044

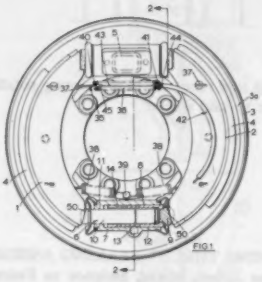
Claims priority, application United Kingdom, June 5, 1974, 24861/74

Int. Cl.² F16D *65/52*

U.S. Cl. 188—331 **12 Claims**

1. A vehicle brake of the duo-servo type comprising arcuate primary and second shoes carrying friction linings for engagement with a rotatable drum and having adjacent actuated ends and adjacent non-actuated ends, an actuator for separating said actuated ends to apply the brake, a strut assembly having opposite ends defining shoe abutments with which said non-actuated ends engage and which are spaced apart in a longitudinal direction by a longitudinal dimension substantially greater in length than the length of a maximum transverse dimension of said strut assembly normal to said longitudinal dimension, a housing fixed between said non-actuated ends

and having an open-ended through bore in which said strut assembly is slidably guided bodily and from which said opposite ends of said strut assembly project to transmit a thrust from said primary shoe to said secondary shoe when said primary shoe is carried round with said drum in the application of the brake with said strut assembly sliding bodily in and with respect to said housing, and anchorage for engagement by said actuated end of said secondary shoe to take drag on said shoes in the application of the brake, wherein said strut

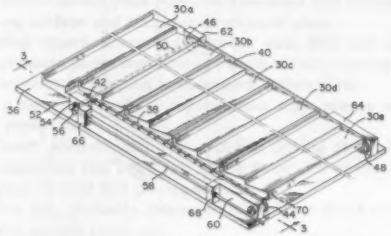


assembly comprises threadably engaged members which are relatively rotatable to increase the effective length of said strut assembly to compensate for wear of said friction linings, a worm wheel is incorporated for effecting relative rotation of said members, and transmission means are incorporated for operating said worm wheel automatically to increase the effective length of said strut assembly, said transmission means being arranged to sense relative movement between said shoes when said shoes are separated in the application of the brake.

4,026,395
DISPLAY CASE

Arthur E. Johnson, 1518 S. Shelton St., Seattle, Wash. 98108

Filed Aug. 25, 1976, Ser. No. 717,530
Int. Cl.² A47F *5/02*; A45C *3/02*
U.S. Cl. 190—16 **8 Claims**



1. A display case comprising:

a plurality of rectangular display trays having transverse edges extending between first and second longitudinal edges, said trays being arranged with their longitudinal edges adjacent the longitudinal edges of adjacent trays;

conveyor means positioned adjacent a transverse edge of said display trays, said conveyor means defining an oval loop occupying a vertical plane extending between first and second ends, the upper portion of said loop moving in a first direction toward said first end and the lower portion of said loop moving in a second direction opposite said first direction toward said second end;

connector means joining said conveyor means to each of said trays at a position on said trays toward the first longitudinal edges, said first longitudinal edges being the longitudinal edge of each tray closest to said first end, said connector means advancing said trays along the path of said conveyor means while permitting pivotal movement of said trays about their longitudinal axes;

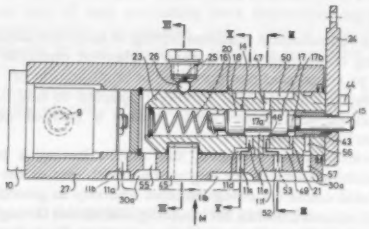
an upper support surface extending from near said second end toward said first end to a point spaced from said first end approximately one transverse edge of said tray; and

a lower, support surface positioned below said upper support surface by at least the thickness of said trays, said lower support surface extending in said first and second directions beyond said upper support tray such that said conveyor means advances said trays along said support surface in said first direction to said first end to where said trays pivot downwardly so that the second edges of said trays contact said lower support surface, said conveyor means then lowering the first longitudinal edges to said lower support surface and then advancing said trays along said lower support surface in said second direction to second end where said first longitudinal edges are lifted onto said upper support surface.

4,026,396
CONTROL DEVICE FOR FORWARD-REVERSE TRANSMISSION GEARS

Julius Hubl, and Franz Parzl, both of Munich, Germany, assignors to Carl Hurth, Maschinen- und Zahnradfabrik, Munich, Germany

Filed Sept. 13, 1974, Ser. No. 505,838
Claims priority, application Germany, Sept. 19, 1973, 2347043
Int. Cl.² B60K *29/02*
U.S. Cl. 192—4 A **3 Claims**



1. A control device for controlling transmission means on motorized vehicles having brake actuating means thereon, comprising:

housing means having a bore therein;

hollow slide valve means selectively rotatably mounted in said bore and manually operable means at one end of said housing means connected to said hollow slide vlave means for selectively rotating said slide valve means relative to said housing means, said hollow slide valve means including means for preventing a relative axial movement between said slide valve mean and said housing means, said slide valve means having angularly spaced ports thereon;

first means for connecting said angularly spaced ports to a source of pressure medium;

first and second passageway means in said housing means for selectively connecting said angularly spaced ports on said slide valve means to said transmission means in response to a rotation of said slide valve means;

spool means radially inwardly spaced from said angularly spaced ports on said slide valve means and being reciprocally mounted in said hollow slide valve means and having blocking means thereon for blocking the application of pressure medium to said angularly spaced ports in response to a reciprocation of said spool means and, consequently, the application of pressure medium to said first and second passageway means;

resilient means for urging said spool means to a first position

whereat said blocking means is spaced from said angularly spaced ports; and

pin means projecting outwardly from said housing means at one end thereof for engaging said spool means in response to a brake actuation to effect a moving of said spool means to a second postion against the urging of said resilient means whereat said blocking means blocks said angularly spaced ports in response to an actuation of said brake actuating means said pin means being arranged on the same side of said housing means as said lever means and is encircled by said lever means, said pin means further including a piston having a pin thereon reciprocally mounted in a chamber, said chamber being pressurized in response to said brake actuation, said pin engaging one end of said spool means.

4,026,397

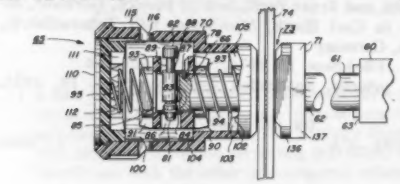
CONTROL KNOB CLUTCHES WITH LOCK

Robert W. Raus, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 6, 1975, Ser. No. 619,759

Int. Cl.² F16D *11/04*

U.S. Cl. 192—48.1 **7 Claims**



1. In a reproduction machine having at least one adjustable operating component with a control element operable when rotated to adjust said component, the combination of:

an internal clutch collar drivingly coupled to said control element, said clutch collar having a pair of discrete clutching surfaces;

an exterior control sleeve, said sleeve having a pair of clutching surfaces for engagement with one or the other of said collar clutching surfaces whereby to provide first and second clutches for coupling said sleeve through said clutch collar with said control element to permit said component to be adjusted by rotation of said sleeve;

means supporting said control sleeve for movement relative to said clutch collar for engaging one or the other of said first and second clutches selectively; and

locking means actuable to restrain relative movement between said control sleeve and said clutch collar and prevent engagement of either of said first and second clutches.

4,026,398

CLUTCH RELEASE BEARING

Otto Matyschik, Nudlingen, and Leo Kühnlein, Schweinfurt, both of Germany, assignors to SKF Industrial Trading and Development Company, B.V., Nieuwegein, Netherlands

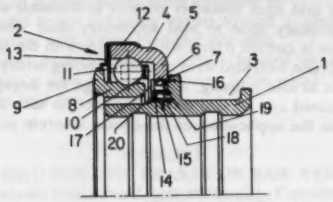
Filed May 20, 1975, Ser. No. 579,265

Claims priority, application Germany, June 1, 1974, 7419066[U]

Int. Cl.² F16D *23/14*

U.S. Cl. 192—98 **13 Claims**

1. In a clutch release bearing including a sliding sleeve, an outer race encircling said sleeve and provided with a flange oriented toward the axis of the bearing, and a holding ring fixedly mounted on the outer surface of said sliding sleeve, with the outer race being radially displaceable on the sliding sleeve, the improvement in combination therewith wherein said flange includes circumferentially spaced recesses opening toward the axis of the bearing, and said holding ring has projections distributed around and extending from its circumfer-



ence, which engage said recesses for preventing rotation of the outer race relative to said sleeve.

4,026,399

SELF-ALIGNING THRUST BEARING ASSEMBLY

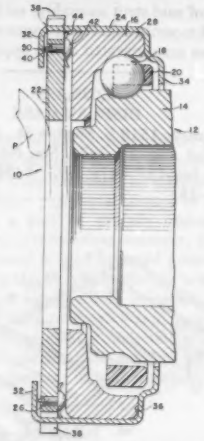
Eli M. Ladin, Ann Arbor, Mich., assignor to Federal-Mogul Corporation, Detroit, Mich.

Filed Oct. 16, 1975, Ser. No. 623,181

The portion of the term of this patent subsequent to Jan. 13, 1993, has been disclaimed.

Int. Cl.² F16D *23/14*

U.S. Cl. 192—98 **16 Claims**



1. A self-aligning thrust bearing assembly comprising,

a bearing unit including an inner race member, an outer race member, and a plurality of rolling elements therebetween,

a thrust receiving member,

means supporting said thrust receiving member and being disposed about and secured on one of said race members,

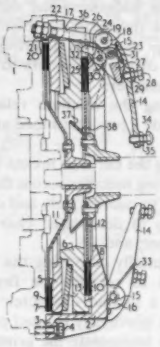
means for allowing relative motion between said support means and said thrust receiving member as well as relative motion between said thrust receiving member and said bearing unit in a direction extending radially only of the longitudinal axis of said one of said race members, and in a direction extending along the longitudinal axis only of said one of said race members, and simultaneously in both said directions,

said means for allowing relative motion including spacer means disposed between said thrust receiving member and an adjacent portion of one of said race members.

4,026,400
DUAL FRICTION CLUTCH

Dennis George Rawlings, Leamington Spa, England, assignor to Automotive Products Company Limited, England

Filed Mar. 2, 1976, Ser. No. 663,244
Claims priority, application United Kingdom, Mar. 5, 1975, 9050/75
Int. Cl.[2] F16D *13/26*
U.S. Cl. 192—99 A 7 Claims

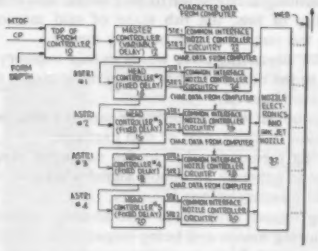


1. A friction clutch comprising:
a flywheel having a first driving surface thereon;
a driving plate attached to the flywheel and having a second driving surface thereon facing said first driving surface;
a first pressure plate interposed between the flywheel and the driving plate and supported for rotation with the flywheel;
a second pressure plate interposed between the driving plate and said first pressure plate and supported for rotation with the flywheel;
a first driven plate interposed between said first driving surface and said first pressure plate;
a second driven plate interposed between said second driving surface and said second pressure plate;
spring means interposed between said first and second pressure plates and acting on each of said pressure plates to exert a clamping load on each driven plate;
and a plurality of release mechanisms, each release mechanism comprising:
a lever, pivotably connected to the driving plate about a respective first pivot axis on the other side of the driving plate to said first driving surface;
a first link, pivotably connected to the lever about a respective second pivot axis;
an abutment on said first link;
adjustment means on the lever to contact said abutment to move said first link with the lever when the lever is pivoted in one direction;
an abutment member, pivotably connected to said link first about a respective third pivot axis parallel to said first pivot axis and operably connected to said second pressure plate to move said second pressure plate away from said second driving surface when the lever is pivoted in said one direction;
a second link operatively connected to the lever and said first pressure plate to move said first pressure plate away from said flywheel when the lever is pivoted in said one direction;
and means on the lever for engagement with a clutch release bearing which is operable to rotate said lever in said one direction.

4,026,401
CIRCUITRY FOR GENERATING A PLURALITY OF INDEPENDENT INK PRINT CONTROL SIGNALS

Ivan G. Doane, North Tonawanda, N.Y., assignor to Moore Business Forms, Inc., Niagara Falls, N.Y.

Continuation of Ser. No. 622,432, Oct. 14, 1975, abandoned. This application Aug. 18, 1976, Ser. No. 715,574
Int. Cl.[2] G01D *15/18*
U.S. Cl. 197—1 R 8 Claims

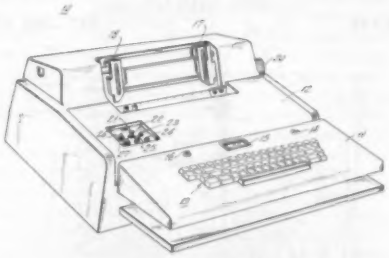


1. A printing system wherein variable alpha/numeric data is printed by a plurality of ink jets in registered and aligned relationship with fixed data printed on a moving web;
means for generating a first time dependent signal representative of the position of said alpha/numeric data to be printed on said web;
delay means responsive to said first time dependent signal for producing a plurality of successive second time dependent signals each being separated by a time interval;
a plurality of controller means each responsive to a respective one of said secondary time dependent signals for independently generating print control signals and wherein at least one of said means is responsive to said first time dependant signal; and
means responsive to said plurality of print signals for controlling the plurality of ink jets onto the moving web.

4,026,402
INCREMENTAL LINE PRINTER

William Jerry Byrd, Nashua, N.H., assignor to Centronics Data Computer Corporation, Hudson, N.H.

Filed July 28, 1975, Ser. No. 599,679
Int. Cl.[2] B41J *3/04*
U.S. Cl. 197—1 R 8 Claims



1. A dot matrix printer comprising:
a paper document holder for supporting a paper document;
a carriage assembly reciprocally movable across said document between end points spaced apart by an amount comprised of *m* equispaced character intervals;
a print head assembly mounted on said carriage assembly for printing successive dot columns wherein *n* dot columns represent a character interval;

means for selectively moving said carriage assembly in a forward or a reverse direction;

registration means associated with said paper document holder and having a predetermined pattern of at least d equispaced indicia wherein $d = n \times m$;

sensing means mounted on said carriage assembly for sensing said pattern to generate pulses representative of said pattern whenever said carriage is moving;

a p stage memory means, p being an integer greater than 1, for storing a plurality of code words, each code word representing a character to be printed and comprising a plurality of bits, the pth stage of said memory means being the output of said memory means;

means for advancing code words in said memory from one stage to the next each time said sensing means traverses a character interval;

means coupled to said sensing means for determining the direction of movement of said carriage;

monitoring means coupled to the output of said memory means to generate an enable signal whenever the output of said memory means is empty;

counting means coupled to said sensing means and said monitoring means and being respectively incremented or decremented from a predetermined count when said carriage assembly is moving respectively in the forward or the reverse direction and when said enabling signal is present;

said moving means comprising forward drive means for moving said carriage assembly in a forward direction during printing;

brake means for halting said carriage assembly;

means responsive to said enabling signal for disabling said forward drive means and including first delay means responsive to the disabling of said forward drive means for activating said brake means a predetermined time delay after disabling of said forward drive means to move said print head assembly beyond the last printed character to permit unimpeded observation thereof.

4,026,403

AUTOMATIC PRINTER WITH PLURALITY OF REPLACEABLE PRINTING MEMBERS

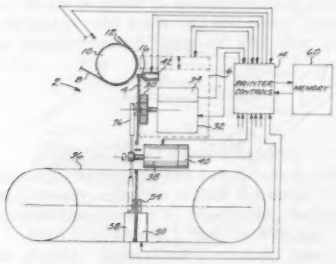
Fumiyuki Inose, San Jose, and Akio Komatsu, Cupertino, both of Calif., assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 12, 1976, Ser. No. 657,608

Claims priority, application Japan, Feb. 14, 1975, 50-17930

Int. Cl.² B41J *1/30*

U.S. Cl. 197—53 **15 Claims**



1. In a printer assembly for printing a large number of characters on a medium from at least three replaceable character printing members, each character printing member containing a plurality of characters with at least some characters not contained on another printing member, the improvement comprising:

a carriage means for operatively supporting a character printing member relative to the medium;

storage means for holding a plurality of character printing members;

exchange means for returning a character printing member from the carriage means to the storage means and replacing it on the carriage means with another character printing member;

character memory storage means for receiving and storing a predetermined amount and location of characters that are contained on at least three separate printing members including means for designating all of the characters to be printed from each character printing member;

control means for addressing the memory storage means and to select a first printing member and to scan the memory storage means to determine the character and location of all of the characters to be printed from the first printing member;

means for moving the medium relative to the carriage means to provide a predetermined area of the medium for printing;

means for moving the carriage means with an operative first character printing member across the predetermined area of the medium to coordinately and completely print all of the first group of designated characters from the first printing member; and

means for sequentially activating the exchange means and control means to replace the first character printing member with a second character printing member for rescanning the previously printed predetermined area of the medium to interpolate the printing of all of a second group of designated characters from the second printing member and to further replace the second character printing member with a third character printing member to interpolate the printing of all of a third group of designated characters from the third printing member of the medium.

4,026,404

APPARATUS FOR THE BODILY SHIFTING OF A PRINTING ROLLER

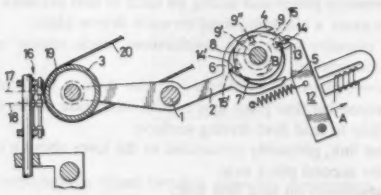
Gottfried Burkhardt, Am Bahndamm 264, 8501 Winkelhaid, Germany

Filed Nov. 13, 1975, Ser. No. 631,636

Claims priority, application Germany, Nov. 15, 1974, 2454218

Int. Cl.² B41J *11/14*

U.S. Cl. 197—73 **4 Claims**



1. An apparatus for moving a printing roller in parallelism with itself between a first printing position and a second printing position which comprises; lever means connected at one end to the roller, eccentric means engaging said lever means for actuation of the lever means and therethrough said printing roller, a driven shaft, and intermittently operable coupling means connecting said shaft to said eccentric means for effecting rotation of the eccentric means, said coupling means including a pair of axially spaced discs rotatable on said shaft, a coil spring having one end connected to each disc and surrounding said shaft and biased in a direction to tighten on said shaft when said discs are free on said shaft, said eccentric means being connected to one of said discs to rotate therewith, and pawl means engageable with said discs for holding

said discs against rotation and in such relatively rotated position that said spring is loose on said shaft and said shaft is free to rotate in said spring.

4,026,405

PROCESS AND APPARATUS FOR DETERMINING THE MAGNITUDE OF THE PAPER ADVANCE COMMANDED IN A PRINTING MACHINE

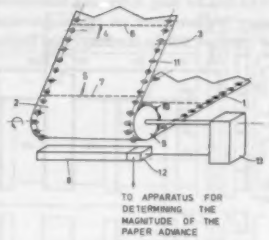
Gérard de Poncins, Neuilly, Seine, France, assignor to Compagnie Honeywell Bull (Societe Anonyme), Paris, France

Continuation-in-part of Ser. No. 413,700, Nov. 7, 1973, abandoned. This application Apr. 28, 1975, Ser. No. 571,923

Claims priority, application France, Nov. 9, 1972, 72.39746

Int. Cl.² B41J *15/00*

U.S. Cl. 197—133 R **7 Claims**



1. A process for determining the magnitude of the paper advance commanded in a printer, notably a printer associated with a data processing unit, the printing support being constituted by a series of sheets, each bounded by a top and bottom edge, and having equal heights, comprising the steps of:

a. determining at least one position, expressed by a whole number of spaces and with regard to the top edge of a first sheet, for a stopping level assigned to a particular kind of data that may be printed, and for the printing line at which the printer has stopped;

b. comparing, with regard to the top edge of the first sheet, the difference between said stopping level and the position of the printing line at which the printer has stopped;

c. commanding a jump which corresponds to the difference, expressed by a whole number of spaces, between the position of the stopping level and the position of the line at which the printer has stopped when the comparison discloses a stopping level farther from the top edge than the printing line at which the printer has stopped; and

d. commanding a jump to the sheet following said first sheet which jump corresponds to the difference, expressed by a whole number of spaces, between the positions of the first stopping level added to the number of spaces in the height of a sheet and the position of the line at which the printer has stopped.

4,026,406

MACHINE FOR WITHDRAWING BREAD SLICES OR LIKE PRODUCTS FROM A CONTINUOUS CYCLE BELT-TYPE BAKING OVEN, AND PRESENTING THEM IN A HORIZONTAL STACK

Vinicio Gazzarini, Reggio Emilia, Italy, assignor to Barilla G. & R. F.1li S.p.A., Parma, Italy

Filed July 8, 1975, Ser. No. 593,984

Int. Cl.² B65G *47/22*

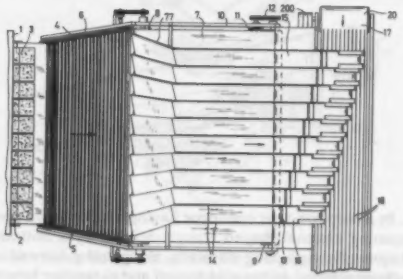
U.S. Cl. 198—420 **6 Claims**

1. Machine for handling bread slices and the like comprising:

successive first, second and third conveyor means, the first of which is adapted to receive a plurality of parallel rows of said slices while lying flat, and the second of which comprises a belt and guide means above said belt,

inclined chute means defining a plurality of parallel channels at the outlet end of said first conveyor means for delivering said slices to said second conveyor means, said chute being positioned and configured to deliver said slices onto said second conveyor with their edges downward and their major surfaces parallel to the path of travel of said second conveyor means, and

means for dividing said slices into groups having aligned vertical edges as said second conveyor means advances, said dividing means comprising means for halting a transverse line of vertical slides in a certain section of the belt including a set of levers having a soft surface, which



branch from a transverse shaft and lie above the belt, and are arranged for insertion between the guides situated on the belt and a fixed plate situated on the belt below said levers and on which the slices are pressed, said levers being mounted on a rotatable shaft controlled by the engagement of a lateral lever fixed to the shaft with a translatable cam fixed to the rod of a cylinder-piston unit,

said third conveyor means being positioned at the output end of said second conveyor means and at right angles thereto so as to receive said groups of slices from said second conveyor means and advance them in a direction perpendicular to the major surfaces of said slices.

4,026,407

CONVEYORS FOR MINERAL MINING INSTALLATIONS

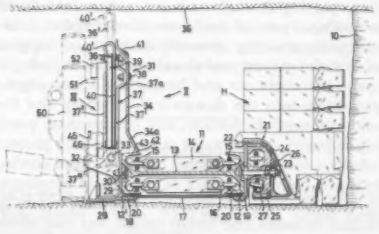
Werner Georg, Lunen, Germany, assignor to Gewerkschaft Eisenhutte Westfalia, Westphalia, Germany

Filed Mar. 1, 1976, Ser. No. 662,607

Claims priority, application Germany, Mar. 6, 1975, 2509802

Int. Cl.² E21C *35/20*

U.S. Cl. 198—735 **14 Claims**



1. The combination of a conveyor for conveying material in a mineral mine working, a screen capable of screening off the working zone and means for pivoting the screen to the conveyor to permit the screen to pivot to a collapsed position when desired to allow access to the working zone, wherein the screen is composed of a series of sections arranged end-to-end, each section being independently pivotable, and wherein

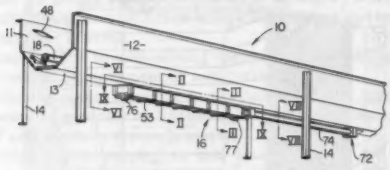
each section is composed of a lower wall resiliently mounted to the conveyor and pivotable in relation thereto and an upper wall which is raisable and lowerable in relation to the lower wall.

4,026,408

CHIP CONVEYOR

Roger T. Becker, Kalamazoo, Mich., assignor to Kalamazoo Conveyor Company, Kalamazoo, Mich.

Filed Feb. 9, 1976, Ser. No. 656,817
Int. Cl.² B65G *25/08*
U.S. Cl. 198—741 **4 Claims**



1. In a harpoon-type conveyor having an elongated upwardly-opening channel-shaped trough defined by a bottom wall and upwardly projecting sidewalls, elongated guide rail means fixedly positioned within said trough and extending lengthwise thereof, said guide rail means being fixed to and projecting upwardly from said bottom wall, an elongated harpoon-type material advancing assembly slidably supported on said guide means for unidirectionally moving material along said trough, and drive means interconnected to said material advancing assembly for reciprocating same within said trough, the improvement comprising:

said drive means being disposed in its entirety between the ends of said material advancing assembly and drivingly interconnected to an intermediate portion thereof, said drive means including motor means positioned adjacent the bottom wall but disposed externally of said trough;

narrow elongated slot means formed in and through the bottom wall of said trough intermediate the ends thereof, said elongated sot means being substantially aligned with said guide means;

elongated track means extending substantially coextensively of said slot means and being fixed to and spaced downwardly from said bottom wall;

said intermediate portion of said material advancing assembly defining a downwardly opening slot which is elongated in the direction of said assembly and is positioned substantially over said slot means as formed in said bottom wall;

shield means fixed to said bottom wall and projecting upwardly therefrom on opposite sides of said slot means for preventing the material being conveyed along said trough from passing through said slot means, said shield means including a pair of shield members fixed to said bottom wall and projecting upwardly therefrom on opposite sides of said slot means, said shield members defining a narrow space therebetween and having the upper edges thereof projecting into the downwardly opening slot formed in said intermediate portion, said intermediate portion having opposed spaced-apart sidewalls which project downwardly a sufficient distance to overlap and confine therebetween the upper edges of said shield members;

said drive means also including connecting means interconnected between said motor means and said intermediate portion of said material advancing assembly, said connecting means including a reciprocating carriage movably supported on said track means solely for rectilinear reciprocating movement in the lengthwise direction thereof;

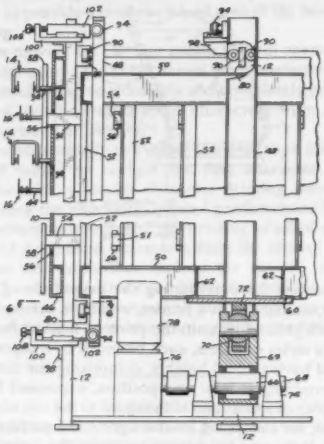
said connecting means also including a connecting member rigidly fixed to said carriage means and projecting upwardly therefrom through said slot means into the interior of the slot formed in said intermediate portion of said assembly, said connecting member being separable from said intermediate portion, and said intermediate portion having end walls defining the opposite extremities of said slot for confining said connecting member therebetween, whereby reciprocating movement of said carriage and of the connecting member carried thereby causes a corresponding reciprocating movement of said assembly.

4,026,409

HELICAL STORAGE AND CONVEYING UNIT

Thomas C. Stockdale, Warren, Mich., assignor to F. Jos. Lamb Company, Warren, Mich.

Filed May 14, 1976, Ser. No. 686,412
Int. Cl.² B65G *25/04*
U.S. Cl. 198—774 **18 Claims**



1. A helical storage and conveying unit comprising, means forming an upright, generally cylindrical outer support, means forming an upright, generally circular inner support disposed within said outer support and having its outer periphery in proximate radial relation to the outer support, a helical guideway supported on and extending around said outer support, a plurality of radially extending support brackets mounted on said inner support and extending through said outer support, a helical guideway mounted on the outer ends of said suppport brackets, the convolutions of said two guideways being vertically aligned and alternately spaced, means for reciprocating the inner support vertically and vertically extending guides on one of said supports and guide rollers on the other support engaging said guides, said guides cooperating with said guide rollers for preventing relative circumferential motion between said supports and guideways.

4,026,410

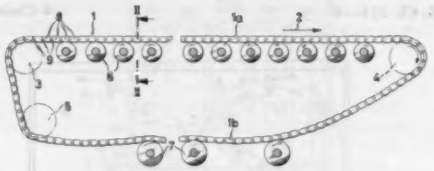
TRAVELLING GRATE CHAIN

Reinhard Körting, Neubeckum, Germany, assignor to Polysius AG, Neubeckum, Germany

Filed Oct. 23, 1975, Ser. No. 624,869
Claims priority, application Germany, Nov. 19, 1974, 2454835
Int. Cl.² B65G *15/30*
U.S. Cl. 198—848 **14 Claims**

1. A travelling grate chain comprising a plurality of parallel strands of chain links, such links being articulately connected together by grate pins that extend transversely over the entire width of the grate, wherein the improvement comprises rod-like holding members which are mounted on the chain and extend substantially parallel to the grate pins, and assemblies of individual support bars whose upper edges are higher than

the chain links, each support bar having two recesses to receive two rod-like holding members, and each assembly of support bars extending substantially between the longitudinal centers of two chain links, being supported by a separate pair



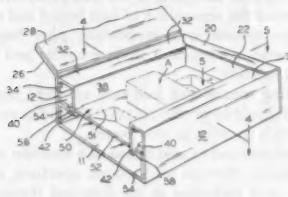
of rod-like holding members, for receiving material deposited on the travelling grate chain, and comprising slots for the passage of treatment gas, each pair of rod-like holding members being interrupted at an intermediate point to provide a gap for insertion and removal of the support bars.

4,026,411

HOLLOW WALL DISPLAY CARTON

Fred J. Johnson, Long Beach, Calif., assignor to Container Corporation of America, Chicago, Ill.

Filed June 7, 1976, Ser. No. 693,157
Int. Cl.² B65D *5/50*
U.S. Cl. 206—45.19 **7 Claims**



1. In a reinforced, hollow wall, display carton, formed of foldable paperboard, for holding at least one packaged article, the combination of:

a. a body including a bottom wall and opposed pairs of side and end walls foldably connected to and upstanding from the side and end edges of said bottom wall and connected to each other to form a tray-like structure open at the top;

b. a horizontally disposed platform in said body including:

i. a main panel co-extensive with and spaced above said bottom wall;

ii. opposed pairs of flanges foldably connected at their upper edges to the side and end edges of said main panel and extending downwardly therefrom to said bottom wall inwardly adjacent said body side and end walls, respectively;

iii. said main panel presenting at least one opening extending therethrough for retaining a packaged article in spaced relation to said body walls;

c. said body including opposed pairs of side and end wall inner panels spaced inwardly from said side and end walls, respectively, and connected thereto by a relatively narrow top wall;

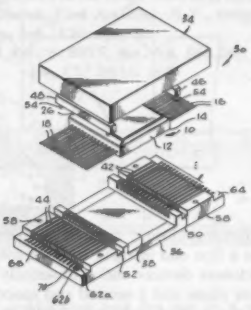
d. said inner wall panels extending downwardly to said platform main panel.

4,026,412

ELECTRONIC CIRCUIT CARRIER AND TEST FIXTURE

Richard D. Henson, 21812 Roscoe Blvd. No. 36, Canoga Park, Calif. 91304

Filed Sept. 26, 1974, Ser. No. 509,653
Int. Cl.² B65D *73/02*
U.S. Cl. 206—331 **7 Claims**



1. An electronic circuit carrier for carrying and protecting a microelectronic circuit in a package, where the microelectronic circuit package has a case for carrying a microelectronic circuit thereon, and has connector leads mounted on the case and insulated from the case and extending from the case, said microelectronic circuit package carrier comprising:

a body made of electrically nonconductive material and having a top surface, a plurality of connector lead openings comprising a plurality of parallel slots formed in the top surface of said body and spaced for reception of the connector leads on a package so that the connector leads are retained in position and protected against bending resulting from physical striking of the connector leads;

a recessed support surface formed in said top surface of said body, said support surface being of sufficient size to support and engage a microelectronic circuit package thereon and being positioned so that the microelectronic circuit package lies against said support surface when the microelectronic circuit package leads lie in said connector lead openings;

a heat sink positioned in said body and serving as at least part of said support surface so that the microelectronic circuit package rests against said heat sink when its connector leads are positioned in said connector lead openings;

transverse slots formed below the top surface of said body and transversely to said connector lead retaining slots;

hold down bars positionable within said transverse slots for holding down connector leads in the bottom of said retaining slots; and

a cover for engagement over the portion of said top surface occupied by a microelectronic circuit package so that both the package and its connector leads are protected against physical damage.

4,026,413

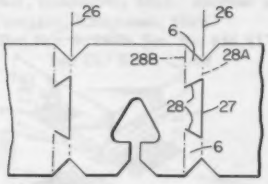
PLASTICS STRIPS

John Philip Britt, 1 Chichester Drive, Springfield, Chelmsford, and Eric Henry Wilson, 32 Tabors Ave., Great Braddow, Chelmsford, both of England

Continuation of Ser. No. 412,289, Nov. 2, 1973, abandoned.
This application Aug. 1, 1975, Ser. No. 601,064
Int. Cl.² B65D *85/24*
U.S. Cl. 206—343 **3 Claims**

1. A strip of stiffly resilient sheet plastics material comprising a plurality of closure devices united edge to edge and delimited by transverse planes of fracture each defined by at

least one transverse cut, each closure device having an aperture formed integrally therein and slit extending from the aperture to a side of the device and each closure device being united to the next adjoining device by a plurality of narrow unsevered portions integral with both said devices the said unsevered portions being defined by additional cuts each extending from an end of a said transverse cut into only one of



the two adjoining closure devices, whereby each unsevered portion has a first end integral with the other of the said two adjoining closure devices and substantially coinciding with a said fracture plane and a second end spaced from said plane and within the area of and integral with the said one closure device, so that on application of a transverse force to a closure device of the strip the unsevered portions will break at their first ends and remain integral at their second ends.

4,026,414

APPARATUS FOR TESTING TOPS OF CONTAINERS FOR DAMAGE

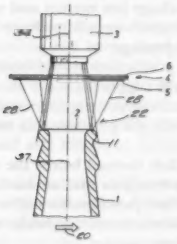
Bernd Ellinger, Regensburg, Germany, assignor to Hermann Kronseder Maschinenfabrik, Neutraubling, Germany

Filed Jan. 7, 1976, Ser. No. 647,300

Claims priority, application Germany, Jan. 18, 1975, 2501975

Int. Cl.² B07C *5/10*

U.S. Cl. 209—111.7 R **15 Claims**



1. Inspection apparatus for detecting flaws and defects in containers comprises conveying means for moving containers in a path through an inspection zone, a stationary light sensing head associated with the inspection zone, said sensing head containing a plurality of light sensors arranged around an aperture and forming a continuous 360° sensing screen having a sensing surface larger than the area of the container surface being inspected to afford bottle inspection during bottle movement, a light source associated with said sensing head to provide a light beam through said aperture larger than the area of the container to be inspected for simultaneous reflection from the entire container surface being inspected to said sensing surface and output circuit means coupled to said sensors to sequentially scan each of said sensors as the container moves through the inspection zone and while said container is in said light beam and provide an output signal indicating a container defect.

4,026,415

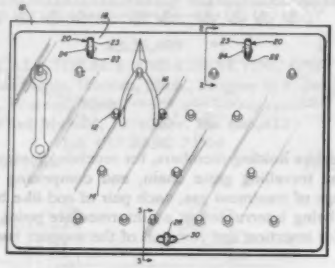
PILFER-PROOF DISPLAY

John F. Sarley, Darien, Ill., assignor to Litton Industrial Products, Inc., Berlin, Conn.

Filed June 17, 1976, Ser. No. 697,150

Int. Cl.² A47F *7/00*

U.S. Cl. 211—4 **4 Claims**



1. A pilfer-proof display comprising

a board including an area having a predetermined configuration,

a plurality of object receiving posts secured to said board within said area with the free end of each of said posts extending a selected distance from said board,

a transparent cover member having an area substantially coextensive with said board area,

at least one aperture in said transparent cover member proximate one edge thereof,

a second aperture in said transparent cover member remote from said one edge,

at least one supporting post secured to said board at a location selected to permit passage through said one aperture,

said supporting post including at the free end thereof means for preventing the separation of said board and said cover member proximate said supporting post beyond said selected distance when said cover member and board are in parallel relation,

said preventing means and said one aperture being selectively configured to permit rotation of said cover member about an axis parallel to said board,

a closure post secured to said board at a location selected to permit passage through said second aperture, and

said closure post including at the free end thereof locking means selectively displaceable from a first position permitting said rotational displacement of said closure member to a second position preventing the separation of said board and said cover member proximate said closure post beyond said selected distance .

4,026,416

LIGHT BULB STORAGE BANK

John M. Cain, Rumson, N.J., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Oct. 14, 1975, Ser. No. 621,692

Int. Cl.² A47F *7/00*

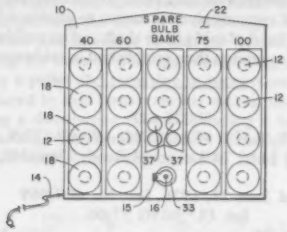
U.S. Cl. 211—26 **2 Claims**

1. A rack for storage of various size of light bulbs comprising

a back plate fixed to spaced divider partitions enclosing open recesses in which light bulbs may be stored, with

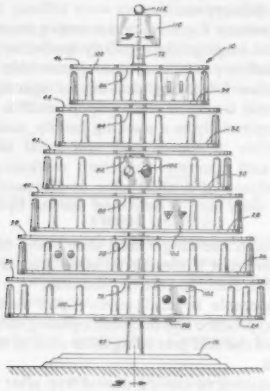
a plurality of socket means, each adaptable for the individual retention of a light bulb base, fixed to the internal side of the back plate and located so that a plurality of said socket means are located in each open recess, said socket means spaced apart from each other and from the divider partitions to provide clearance between light bulbs fixed to said socket means, together with

a face board mounted externally across the rack with markings on the face board to indicate the recommended



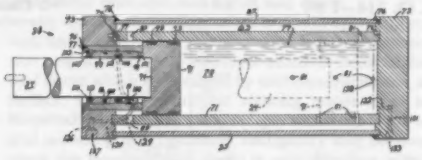
locations for individual storage of light bulbs of a common size in each said open recess.

4,026,417
DISPLAY STAND
Edward H. Streim, Manhasset, N.Y., and Thomas Strasser, Fort Lee, N.J., assignors to Monet Jewelers, Inc., New York, N.Y.
Filed June 26, 1975, Ser. No. 590,753
Int. Cl.² A47F 5/02
U.S. Cl. 211—163 **7 Claims**



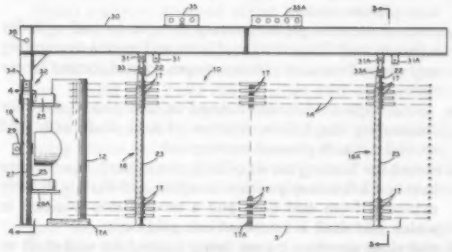
4. A display device comprising a base member, a vertically oriented shaft secured to said base member, a series of horizontally aligned platforms rotatably mounted on said shaft, said platforms having a circular configuration, means on each platform proximate its periphery for retaining a plurality ofdisplay cards, said cards being removable from said retaining means, a series of horizontally aligned guard plates, said guard plates having a circular configuration, means for securing said plates to the shaft so that each plate is positioned above a platform in close proximity thereto, said plates being non-rotatable relative to the shaft, each plate including a notch proximate its periphery for permitting said display cards to be removed from the retaining means on the platforms, each card being irremovable from the retaining means unless the notch is superposed with respect to said card, said platforms and guard plates being axially aligned along the vertical shaft in paired relationship, the diameters of the paired platforms and guard plates being approximately the same, the diameter of said platforms and plates decreasing in length in an upward direction whereby the uppermost platform and plate has the smallest diameter and the lowermost platform and plate has the greatest diameter, a plurality of sleeves mounted on said shaft, means for positioning a separate sleeve between two adjacent guard plates, and means for coupling the guard plates and the sleeves together on the shaft so that the said sleeves and said guard plates are non-rotatable relative to the shaft.

4,026,418
HYDRAULIC CUSHIONING UNIT WITH A GAS RETURN
Vaughn T. Hawthorne, East Amherst, N.Y., assignor to Keystone Industries, Inc., Chicago, Ill.
Filed Apr. 8, 1975, Ser. No. 566,065
Int. Cl.² B61G 9/16
U.S. Cl. 213—8 **15 Claims**



1. A hydraulic cushioning unit for use in a railway car, comprising a high pressure inner member, an outer member encompassing said inner member and mounted concentrically therewith, a piston movable through said inner member, head means at the ends of said members for closing the ends thereof, said head means and said outer member forming a main reservoir, a plurality of holes formed through the wall of said inner member, one only of said head means having a piston rod opening formed therein, a piston rod connected to said piston and extending out of said main reservoir through said opening, at least one reservoir extension means at the upper side of unit, and passage means connecting said extension means and said main reservoir, a hydraulic oil partially filling said main reservoir and said extension means, and an inert gas under pressure filling the remainder of said main reservoir and said extension means, said oil and gas being in contact and intermixing in said main reservoir and said extension means.

4,026,419
INDUSTRIAL TECHNIQUE
Michael Charles Santucci, Barberton, Ohio, assignor to The Babcock & Wilcox Company, New York, N.Y.
Filed Oct. 29, 1975, Ser. No. 626,960
Int. Cl.² B65G 7/00
U.S. Cl. 214—1 H **4 Claims**



2. In combination with boiler components and apparatus for the erection thereof, said apparatus comprising a lifting member having a longitudinal first portion fixedly connected to a second portion depending therefrom, first attachment means disposed along said longitudinal portion for detachably mounting the boiler components thereunder, second attachment means detachably mounting the boiler components to the second portion, and third attachment means disposed along the longitudinal portion for detachably connecting the

device to a first lifting line for lifting the device and the boiler components mounted thereunder.

4,026,420

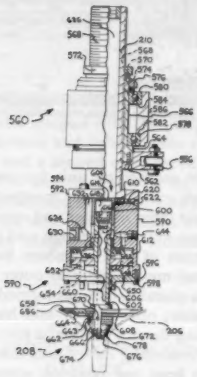
MOTION TRANSLATING APPARATUS AND CONTROLS THEREFOR

Mario Cuniberti, Columbus, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 541,761, Jan. 1, 1975, which is a division of Ser. No. 418,553, Nov. 23, 1973, Pat. No. 3,896,926, which is a division of Ser. No. 295,530, Oct. 6, 1972, Pat. No. 3,841,497. This application May 24, 1976, Ser. No. 689,697

Int. Cl.² B66C 1/02

U.S. Cl. 214—1 BT **3 Claims**



1. Vacuum chuck apparatus comprising:

a. a hollow piston shaft;

b. a cylinder having a bore for slidably receiving said piston shaft, said cylinder including a second bore larger than said first mentioned bore;

c. a piston head carried on said shaft and slidably received in said second larger bore;

d. a vacuum pickup head carried on a portion of said hollow piston shaft which extends from said cylinder, said pickup head communicating with the hollow interior of said piston shaft;

e. vacuum plenum means formed in said cylinder adjacent said bore which receives said shaft and means for connecting said vacuum plenum means to a vacuum source;

f. said piston shaft having aperture means formed therein for connecting the hollow interior thereof with said vacuum plenum means;

g. second vacuum plenum means formed in said cylinder adjacent said first-mentioned bore and means connecting said second vacuum plenum means to said second larger bore;

h. second aperture means formed in said piston shaft for connecting the hollow interior of said shaft with said second vacuum plenum means; and

i. means for limiting travel of said piston shaft in said bore between a first stop position in which said shaft is slidably extended from said bore and a second stop position in which said shaft is retracted into said bore;

j. said shaft aperture means being located on said shaft so that when said shaft is at said first stop position there is no communication between the hollow interior of said shaft and said vacuum plenum but when said shaft is slidably moved from said first stop position toward said second stop position in response to contact with an article to be grasped said aperture means is moved into alignment with said vacuum plenum, said second aperture means being located in said shaft relative to said first-mentioned aperture means so that slidable movement of said piston shaft in said first-mentioned bore will connect said first-mentioned aperture means to said first-mentioned vacuum plenum means to enable an article to be grasped by said pickup head before said second aperture means connects the hollow interior of said shaft to said second bore via said second vacuum plenum means to enable a lifting by said piston head of said piston shaft and an article grasped thereby by a vacuum then established in said second bore.

4,026,421

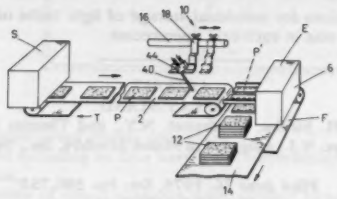
MEAT SLICE STACKING APPARATUS

Walter Edward Lotz, 74 Laureleaf Road, Thornhill, Canada (L3T 2Y1)

Filed June 21, 1976, Ser. No. 697,969

Int. Cl.² B65G 57/06

U.S. Cl. 214—6 DK **13 Claims**



1. In meat slice stacking apparatus:

a transport for conveying successive meat slices from a source to a delivery station;

means at said source for loading successive meat slices on said transport in generally regularly spaced sequence;

a trap at said delivery station alternately movable between a closed position for taking delivery of successive meat slices from said transport and an open position for releasing them sequentially to a stacking facility, said transport being operable at speeds and said meat slices being spaced on said transport to permit re-closing the trap following release of a meat slice as aforesaid before a succeeding meat slice is delivered thereto by said transport;

a sensor located for sensing a meat slice being conveyed by said transport past a sensing location after a preceding meat slice has come to rest on said trap;

mechanism operable by said sensor upon sensing a said meat slice to procure and maintain opening of the trap for the release of the said preceding meat slice to the stacking facility; and

means for procuring re-closing of said trap after the release of said preceding meat slice and before delivery of another meat slice thereto.

4,026,422

PALLETIZING APPARATUS WITH MEANS FOR FORMING LAYER OF ARTICLES

Antoine Joseph Leenaards, Lausanne, Switzerland, assignor to Crown Cork & Seal Company, Inc., Philadelphia, Pa.

Continuation of Ser. No. 390,798, Aug. 23, 1973, abandoned. This application Dec. 23, 1975, Ser. No. 643,901

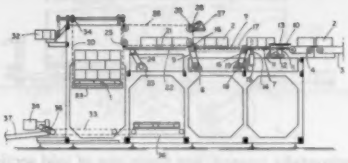
Claims priority, application Belgium, Aug. 29, 1972, 788123

Int. Cl.² B65G 57/00, 47/26

U.S. Cl. 214—6 P **6 Claims**

1. Palletizing apparatus serving to stack onto a pallet successive horizontal rows of packages such as packing cases, boxes or the like, said palletizing apparatus including an input section for packages comprising an input conveyor successively conveying packages in single file to a fixed point, a support section for the formation of packages into spaced rows comprising conveyor means including a set of rollers for receiving the packages from the input conveyor, and transversely extending bar means displaceable forwardly of the

path of packages carried on said conveyor means and rearwardly away from this path, said bar means having the dual function of temporarily stopping the packages in a position close to the end of said conveyor means until the formation of a row and pushing the row or a following row of packages upon forward displacement of said bar means, and a section for stacking the rows of packages comprising an elevator for supporting a pallet and receiving in succession rows of packages displaced by said transverse bar means, the improvement comprising a distributing device including a horizontally extending bar disposed on said conveyor means perpendicular to the axes of said rollers adjacent said fixed point; support



means extending between two of said rollers for supporting said horizontal bar and drive means for moving said support means and horizontal bar laterally across said conveyor means for pushing selected ones of said packages over said conveyor means transversely with respect to the path of movement created by said conveyor means while said conveyor means continues to operate so as to dispose the packages in at least two spaced parallel rows on said conveyor means; and a retractable turning device comprising a vertical bar extending above said set of rollers for engaging the corner of packages being conveyed on said set of rollers so as to turn said packages through right angles and thereby form at least two parallel rows of differently disposed packages.

4,026,423

APPARATUS FOR EXTRACTING BULK MATERIAL FROM DUMPS

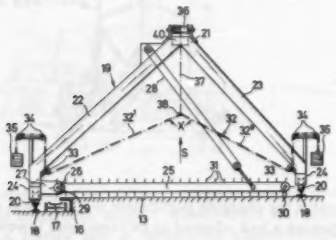
Frtiz Schade, Dortmund; Günter Strocker, Holzwickede KreisUnna, and Gerhard Fischer, Dortmund-Kirchhorde, all of Germany, assignors to Gustav Schade Maschinenfabrik, Dortmund, Germany

Filed Sept. 24, 1975, Ser. No. 616,292

Claims priority, application Germany, Sept. 28, 1974, 2446514

Int. Cl.² B65G *65/28*

U.S. Cl. 214—10 **22 Claims**



1. Apparatus for extracting bulk material from a dump having a length, a foot defining the transverse width of said dump, a top defining the height of said dump, and an inclined transverse face extending between said top and said foot, and inclined lateral slopes along said length forming the sides of said dump, said apparatus comprising:

a pair of base portions disposed on either side of said foot moveable in a direction of travel parallel to the length of said dump, a gantry extending from said bases and spanning said dump above said top and said lateral slopes,

a transverse scraper chain conveyor including an arm pivotally mounted on said gantry and having a first working position adjacent said foot and a second working position above said lateral slopes and,

driven clearing means movably arranged on said gantry and having an operating position wherein said clearing means is adapted to work on and to move over substantially the entirety of said transverse face in contact therewith so as to dislodge bulk material from said transverse face, said driven clearing means being moveable out of its operating position to an inoperative position above and clear from said lateral sides and said top of said dump,

whereby when said clearing means is in said operating position and said scraper chain conveyor is in said first position said scraper chain conveyor removes material from said dump which is dislodged by said clearing means, and further, whereby when said clearing means is in said inoperative position and said scraper chain conveyor is in said second working position, said gantry may be moved along the length of said dump in said direction without interference from said clearing means and said conveyor means.

4,026,424

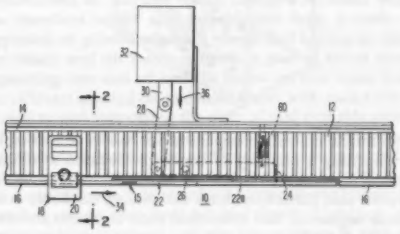
CARRIER DIVERTER GATE FOR CONVEYOR SYSTEM

Ermenegildo Fiorentino, Bridgeport, Pa., assignor to Burroughs Corporation, Detroit, Mich.

Filed Dec. 16, 1975, Ser. No. 641,297

Int. Cl.² B65G *43/00*

U.S. Cl. 214—11 R **7 Claims**



1. A diverter gate assembly for use in a conveyor system for switching from a powered transport path to a gravity controlled path comprising:

at least one carrier comprising a head portion which includes a groove disposed across its lower surface,

transport means for supporting said carrier, said transport means being disposed in a "U" shaped channel, one edge of said channel being situated within said carrier groove and serving as a guide rail to retain said carrier on said transport means during movement thereof,

at least one transfer area located along said channel and being characterized by the absence of said guide rail in said area, adjacent guide rail sections of said channel being present on respective opposite sides of said transfer area,

a gate member comprised of flexible material, said gate member being situated in said transfer area and being interposed between said adjacent guide rail sections of said channel, one extremity of said gate member being positioned in fixed aligned relationship with a first of said adjacent guide sections, a portion of said gate member opposite said fixed extremity being inclined with respect to the plane of said transport means,

said diverter gate being capable of assuming a diverting or non-diverting mode with respect to said carrier, the other extremity of said gate member being in substantial coplanar alignment with the second of said adjacent guide

sections when said gate is in a non-diverting mode and being curved outward away from said second guide section when said gate is in a diverting mode, the radius of curvature assumed by said flexible gate member in said diverting mode being directly proportional to the length of said carrier groove and the thickness of the material of said gate member and being inversely proportional to the width of said groove,

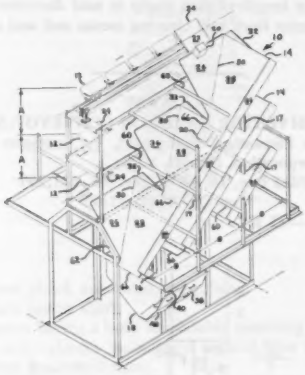
and means coupled to said gate member for selectively controlling the latter in accordance with the desired gate mode.

4,026,425

ARTICLE COLLECTION APPARATUS

Romualdas K. Gruodis, Mount Airy, Md., assignor to Fairchild Industries Inc., Germantown, Md.

Filed May 13, 1975, Ser. No. 577,043
Int. Cl.² B65G *47/46*
U.S. Cl. 214—16 B **10 Claims**



1. An article collection apparatus for use in collecting articles comprising a plurality of conveyors located at different elevations, a plurality of collection slides located adjacent said conveyors, said collection slides comprising stackable collection slide segments, said collection slide segments forming a collection slide having a substantially continuous smooth inclined surface, said collection slide segments having means for changing the direction of articles entering the slide segment from a conveyor, the number of segments forming each of said collection slides being equal to the number of said conveyors, each of said collection slides having means for permitting articles to enter a collection slide from said conveyors at different elevations.

4,026,426

DRYING APPARATUS FOR GRAIN, BEANS AND THE LIKE

Charles C. Shivvers, 614 W. English, Corydon, Iowa 50060

Filed Nov. 10, 1975, Ser. No. 630,177
Int. Cl.² B65G *33/00*, *37/00*
U.S. Cl. 214—17 DB **3 Claims**

1. Apparatus for moving a horizontal layer of uniform thickness of a free flowing particle material along the bottom wall of a circular storage bin toward the center of the bin comprising:

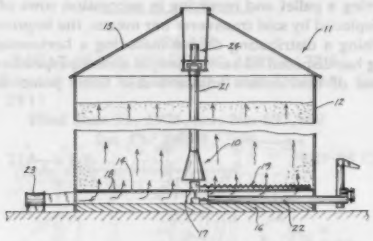
a. a sweep auger extended radially of the bin having a shaft,

b. means for rotating said auger horizontally on said bottom wall about a vertical axis located centrally of the bin,

c. a pair of auger flights of like diameters secured to said shaft having adjacent helices spaced axially of said shaft, one of said flights having a constant pitch and the other of said flights a variable pitch, and

d. cover means connected to said adjacent helices to close the space therebetween over the length of said flights,

e. said pair of flights relatively formed and arranged on said shaft to form a composite flight having adjacent helices of progressively decreasing thickness inwardly of the shaft to provide axially extended sections such that as the auger



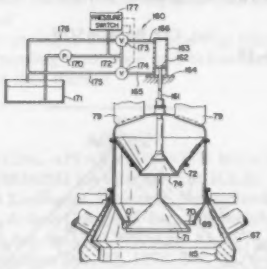
is horizontally rotated, any given one of said sections has the capacity to move inwardly of the auger all of the particle material picked up by the sections located outwardly from said given section, whereby a horizontal layer of material of uniform thickness is moved by said composite flight toward the center of the bin during each revolution of horizontal rotation of the auger.

4,026,427

CHARGING APPARATUS FOR RECEPTACLES

Melvin J. Greaves, Cleveland, and Frank V. Razgaitis, Seven Hills, both of Ohio, assignors to Arthur G. McKee & Co., Cleveland, Ohio

Division of Ser. No. 604,328, Aug. 13, 1975, which is a continuation of Ser. No. 411,924, Nov. 1, 1973, abandoned. This application July 2, 1976, Ser. No. 702,033
Int. Cl.² F27B *5/12*
U.S. Cl. 214—36 **10 Claims**

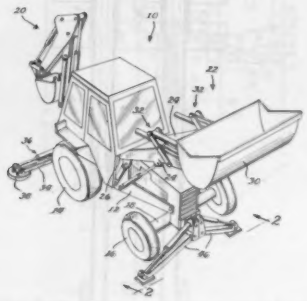


1. Apparatus for charging particulate material into a receptacle comprising a bell adapted to be raised and lowered in an upright path; a member surrounding said bell and having an opening through which said bell normally freely passes as it is raised and lowered in said path, said opening providing a substantially close clearance between said bell and said surrounding member; means for discharging particulate material onto said bell and into said surrounding member; and means for reversing the direction of movement of said bell in the event of an obstruction between said bell and said member that impedes movement of said bell.

4,026,428
STABILIZER ATTACHMENT FOR MATERIAL HANDLING IMPLEMENT

John F. Shumaker, Mount Pleasant, Iowa, assignor to J. I. Case Company, Racine, Wis.

Filed Oct. 28, 1975, Ser. No. 626,262
Int. Cl.² E02F 9/00
U.S. Cl. 214—138 R 8 Claims

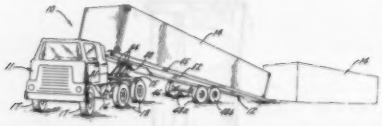


1. A vehicle having an elongated chassis frame with rear wheels supporting a rear end of said chassis frame and front wheels on opposite sides of said chassis supporting a front end of said chassis frame, a first material handling implement extending beyond said front end, said implement including a pair of arms each having one end pivoted on respective sides of said chassis frame intermediate opposite ends thereof with a material handling unit pivotally supported on opposite ends of said arms, rear stabilizer means supported on said rear end of said chassis frame, a second material handling implement pivotally supported on said rear end of said chassis frame, a separate front stabilizer frame secured directly to said chassis frame at said front end between said arms, a pair of stabilizer feet carried by said frame and respectively adapted to extended transversely beyond said front wheels, support means supporting said feet on said stabilizer frame and fluid ram means cooperating with said stabilizer frame and said support means for moving said feet between an extending ground engaging position and a retracted position above the ground.

4,026,429
METHOD OF UNLOADING CONTAINER FROM TRANSPORT VEHICLE

James A. Rumell, 1518 Meadow Lane, Elkhart, Ind. 46514

Division of Ser. No. 410,344, Oct. 29, 1973, Pat. No. 3,934,740. This application Dec. 9, 1975, Ser. No. 639,056
Int. Cl.² B60P 1/04
U.S. Cl. 214—152 11 Claims



1. A method of unloading a cargo container having retractable and extensible support wheels from a transport vehicle having a tractor and a detachable chassis supporting said cargo container, said chassis having a flatbed mounted on a pivot support of a wheeled tandem for relative pivotal and longitudinal movement with respect to said tandem and pivot support comprising the steps of:

a. slidably moving said flatbed in a longitudinal direction relative to said tandem pivot support so that said tandem is located at any desired longitudinal location along a length of said flatbed,

b. extending said container wheels to elevate said container relative to said flatbed and support said container for rolling movement,

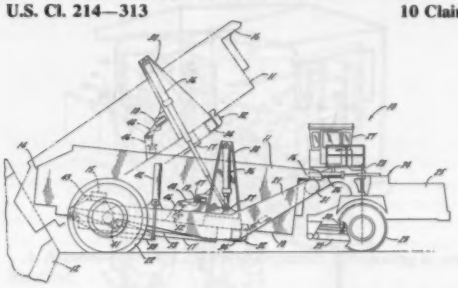
c. tilting said flatbed about said tandem pivot support to a desired angular position relative to the horizontal, and

d. moving said cargo container longitudinally off the end of said flatbed while said container wheels are in an extended container supporting position.

4,026,430
SCRAP BOX CARRIER

Edward S. Kress, P.O. Box 368, Brimfield, Ill. 61517

Filed Aug. 25, 1975, Ser. No. 607,355
Int. Cl.² B65G 65/04
U.S. Cl. 214—313 10 Claims



1. A carrier for handling scrap steel boxes having an open end, side support lugs, and a tongue and elevated bottom at the non-open end, comprising, in combination, a rigid tilt frame having two side members connected by a cross member proportioned so that the frame can be positioned with said side members under said box support lugs, a main frame supported on ground engaging wheels and having an open end into which said tilt frame is fitted, a pair of linear actuators suspending one end of said tilt frame on said main frame, a pair of levers pivoted on said main frame with each lever being pivoted to and supporting the ends of said two side members, and a second pair of actuators mounted on said main frame and connected for pivoting said levers so as to raise and lower said tilt frame side members, said box side support lugs and said support frame side members having linear longitudinally extending guide bar portions and linear U-shaped groove portions which interlock with the bar portions in said groove portions upon relative horizontal movement so that a box in said tilt frame laterally resists spreading of the open end of said frame, said linear actuators being directly coupled between said tilt frame and main frame approximately tangent to the tilt frame pivot arc and having sufficient reach to move said cross member from a lower position beneath the elevated bottom of a box resting on the ground to a high position which pivots said tilt frame on said levers to a steeply inclined, box dumping angle, and said second pair of actuators being able to pivot said levers through a sufficient arc to move said side members from a lower position beneath the support lugs of a box resting on the ground to a high position holding the box on the tilt frame with said bar and groove portions interengaged and the box at a slight angle with the open end high.

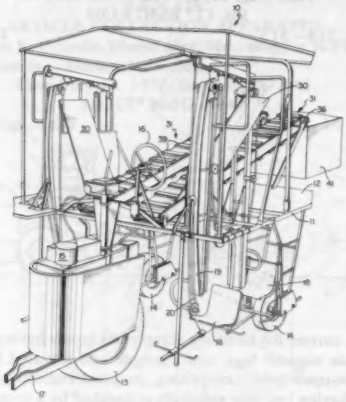
4,026,431
TOBACCO HARVESTER HAVING A BULK CONTAINER FILLED BY MANUAL PRIMERS

William R. Long, Tarboro, N.C., assignor to Long Mfg. N. C., Inc., Tarboro, N.C.

Filed Dec. 18, 1975, Ser. No. 642,105
Int. Cl.² B60P 1/36
U.S. Cl. 214—519 1 Claim

1. In a tobacco harvester adapted to be moved through a field of tobacco plants, the harvester having a frame, deck means on the frame located above the tobacco plants, a plu-

rality of seats suspended from said frame for supporting manual priming workmen between rows of tobacco plants, at least two generally vertically movable conveyor means located on each side of the harvester with each conveyor adjacent a seat so that the conveyor means may be used for transporting primed tobacco leaves upwardly to a discharge position above the deck, and one of said generally vertically movable conveyor means discharging forwardly and the other discharging rearwardly, the improvement comprising inclined slide means oriented in a generally opposite relationship along opposite sides of the deck, each of said slide means having a first portion disposed in a position to receive tobacco leaves discharged from two of the vertically movable conveyor means,



and a second portion extending generally downwardly and inwardly from the side and above the deck, longitudinally movable conveyor means mounted on the deck means of said harvester and extending transversely to said slide means, the forward portion of the upper run of said longitudinal conveyor means being located beneath said second portion of said slide and extending upwardly and rearwardly therefrom, means for driving said longitudinal conveyor so that said upper run moves rearwardly, and a bulk tobacco container removably mounted on said harvester in a position to receive tobacco leaves discharged from said longitudinal conveyor, whereby mature tobacco leaves which are collected by the manual priming workmen and placed on the vertically movable conveyor means are automatically discharged into said container.

4,026,432

LIFT-VEHICLE ASSEMBLY

Theodor Abels, Aschaffenburg-Nilkheim, Germany, assignor to Linde Aktiengesellschaft, Wiesbaden, Germany

Division of Ser. No. 375,008, June 29, 1973, Pat. No. 3,930,563. This application Apr. 4, 1975, Ser. No. 565,111

Claims priority, application Germany, July 6, 1972, 2233281

Int. Cl.² B66F *9/08*

U.S. Cl. 214—672 **12 Claims**

1. A load-lifting assembly for a forklift truck or the like, comprising:

a support;

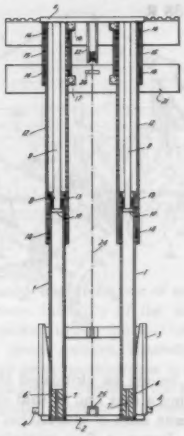
a pair of transversely spaced upright first column members mounted on said support;

a movable mast section comprising at least one pair of circumferentially closed second column members respectively peripherally surrounding and telescopingly slidable on said first column members and vertically shiftable relatively thereto;

a load-engaging carriage vertically shiftable on said section and displaceable relative to said second column members;

a flexible elongated element connected to said carriage for controlling the displacement thereof; and

a hydraulic cylinder arrangement on said section and engageable with said flexible elongated element for displacing said carriage independently of said section, said column members being formed with hydraulic cylinders



connected in parallel with said arrangement and chargeable with hydraulic fluid for raising said section, said hydraulic cylinders of said columns having a total surface area effective to lift said section at most equal to the effective surface area of said arrangement serving to lift said carriage.

4,026,433

CONTAINER PROVIDED WITH AN OUTER TESTPIECE FOR THE ANALYSIS OF URINE AND OTHER ACID LIQUIDS

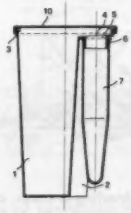
Egidia Crippa, Via Italia 17, Peregallo di Lesmo, Italy

Filed Jan. 15, 1976, Ser. No. 649,185

Claims priority, application Italy, Jan. 16, 1975, 19318/75

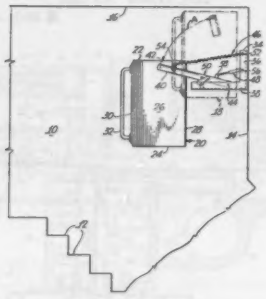
Int. Cl.² B65D *11/02*

U.S. Cl. 215—6 **3 Claims**



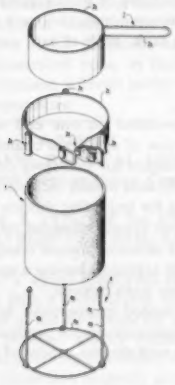
1. A container for analysis comprising a container of an approximate frusto-conical shape provided with a cover, a portion of the side wall of the container being recessed along the length thereof until about the upper edge portion of the container, said edge portion overhanging the recessed portion of the side wall, and a tubular member projecting from the lower part of said edge portion and serving as a support for a testpiece.

4,026,434
SWING DOWN CLOSET
Norman Walter Howard, 3803 Brooklyn Cres., NW., Calgary, Alberta, Canada (T2L 1G9)
Filed June 18, 1976, Ser. No. 697,501
Int. Cl.² A47B *46/00*
U.S. Cl. 220—18 6 Claims



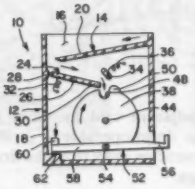
1. A swing down closet comprising a closet body having top, bottom, back and side faces, a pair of rigid support members mountable to an appropriate support surface, a pair of support arms, each arm being pivotable at one end to a corresponding one of said support members and at the other end to one of said side faces proximate said top face, resilient return means connectable between each said arm and said support surface and automatic latch means on at least one of said support members for engagement with at least the corresponding arm to lock said closet body against the force of said return means, said latch means being engagable through downward movement of said closet body and releasable through further downward movement of said closet body.

4,026,435
DISPOSABLE COOKWARE
Joseph S. Hendon, P.O. Box 2524, Gulfport, Miss. 39501
Filed July 24, 1975, Ser. No. 598,729
Int. Cl.² B65D *25/28*
U.S. Cl. 220—85 H 10 Claims



1. Disposable cookware including a disposable container, and a removable handle assembly connected to said container, said removable handle assembly comprising a hand grip member connected to a sleeve, said sleeve being inserted into the container and abutting the inner wall of said container, a contractable locking band encircling the outer wall of the container, and locking means operatively connected to said locking band for contracting and tightening the locking band around the container whereby the side wall of the container is tightly gripped between the sleeve and locking band.

4,026,436
TIME CONTROLLABLE CIGARETTE DISPENSER
Roland X. Madsen, 2341 New Jersey Ave., San Jose, Calif. 95124
Filed Apr. 9, 1976, Ser. No. 675,482
Int. Cl.² B65H *3/50*
U.S. Cl. 221—15 6 Claims

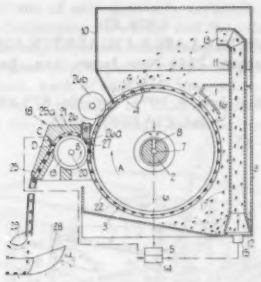


1. A time controlled cigarette dispenser comprising in combination:
a housing;
a downwardly inclined cigarette transfer tray mounted within said housing having a lower discharge end;
a feeder ramp mounted pivotally within said housing having an upper cigarette-receiving end positioned adjacent to and cooperable with said discharge end of the transfer tray;
spring means adapted to bias said feeder ramp and enable said feeder ramp and transfer tray to act cooperably to serially transfer cigarettes from said tray to said ramp;
cigarette retainer means mounted resiliently in said housing adjacent the discharge end of said feeder ramp for controlling the discharge of cigarettes therefrom;
a rotatable member having at least one compartment thereon and adapted to be rotated at a predetermined rotational speed to thereby cyclically position said one compartment beneath the discharge end of said feeder ramp to receive a cigarette therefrom and to deliver said cigarette to a balance tray;
a balance tray pivotally mounted in said housing and adapted to receive a cigarette from said one compartment and to present same to the smoker;
electric motor means for driving said rotatable member at said predetermined rotational speed and control means therefor;
and means carried by said balance tray for deactivating said motor upon the deposit of a cigarette upon said tray and for activating said motor upon the removal of said cigarette therefrom.

4,026,437
SEED DRILL
Howard William Biddle, Histon, England, assignor to Cambridge Consultants Ltd., Cambridge, England
Filed Nov. 17, 1975, Ser. No. 632,623
Claims priority, application United Kingdom, Nov. 22, 1974, 50664/74; June 3, 1975, 23908/75
Int. Cl.² B65H *3/08*
U.S. Cl. 221—211 11 Claims

1. Apparatus for metering and transporting particulate material comprising a hopper for said material, a rotary drum having through apertures in a surface thereof, means for maintaining an uninterrupted pressure difference across said apertures during operation of the apparatus to enable particles to

be picked up by the apertures from said hopper, at least one resilient rotary element co-operating with the drum surface to control the passage of particles at a location in which they leave the drum, a transport passage extending away from said



drum surface adjacent said location, and means disposed externally of the drum operable to produce an air stream to accelerate the particles away from the drum surface along said transport passage.

4,026,438

DEVICE FOR APPLYING PRESSURE TO STACKED ARTICLES

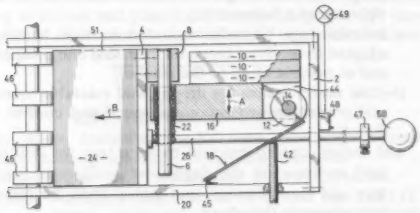
Erich Blume, Wiesbaden-Biebrich, and Eberhard Schörnig, Taunusstein-Orlen, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed July 9, 1975, Ser. No. 594,445

Claims priority, application Germany, July 15, 1974, 2433881

Int. Cl.² B65G *59/00*

U.S. Cl. 221—231 **7 Claims**



1. A device for applying pressure to a stack of flat items to be individually drawn off from the stack, the device comprising: a housing adapted to receive the stack of flat items; a slide member disposed in said housing for horizontal, linear movement therewithin to impart a constant pressure against the stack regardless of the number of items in the stack; a main weight which is movable with respect to said slide member; a roller; said slide member, said main weight, and said roller being operatively coupled together; a bearing between said slide member and said main weight, said bearing having a vertically disposed axis, said bearing providing a connection between said slide member and said main weight, which connection is free from play and which, in part, defines a path of vertical movement of said weight.

4,026,439

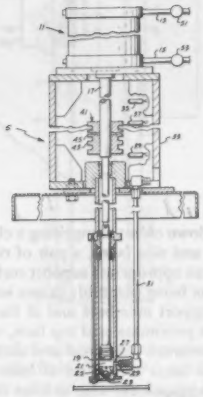
PRECISION FLUID DISPENSING AND MIXING SYSTEM

Eric H. Cocks, 4100 Galt Ocean Drive, Fort Lauderdale, Fla. 33308

Filed June 18, 1975, Ser. No. 587,976

Int. Cl.² B67D *5/22*

U.S. Cl. 222—49 **3 Claims**



1. A system for mixing formulations containing precise quantities of a plurality of individual fluid components comprising

a plurality of fluid supplies,

a mixing tank,

a solenoid valve connected between the mixing tank and each of said plurality of fluid supplies,

metering pump means connecting each of said fluid supplies to said mixing tank, each of said metering pump means comprising

a pump housing

a fluid chamber,

a fluid piston mounted on one end of a piston rod and forming a portion of said fluid chamber,

inlet and outlet means for said fluid chamber,

fluid pressure operated means mounted on the other end of said piston rod for imparting motion to said fluid piston,

calibrated actuator means mounted on said piston rod,

said calibrated actuator means comprising a segmented member with segments having a spacing corresponding to the volume units desired,

signal means mounted in operative relationship with said calibrated actuator means for producing electrical signals in accordance with the movement of said calibrated actuator means,

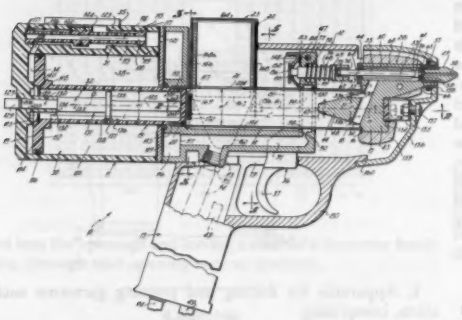
programming means connected to said pump means for receiving signals from said signal means and controlling said pump means in accordance with a pre-determined program to pump precise quantities of fluid from each fluid supply into said mixing tank and,

means connecting each of said solenoid valves to said programming means.

4,026,440
ADHESIVE GUN

Gerald W. Crum, Elyria; Eric T. Nord, Oberlin; Alan B. Reighard, Bay Village, and Simon Z. Tamny, Lorain, all of Ohio, assignors to Nordson Corporation, Amherst, Ohio

Continuation of Ser. No. 500,751, Aug. 26, 1974, abandoned, which is a continuation of Ser. No. 307,020, Nov. 16, 1972, abandoned. This application Nov. 24, 1975, Ser. No. 634,360
Int. Cl.² B67D 5/62
U.S. Cl. 222—146 R 30 Claims



20. A thermoplastic material dispensing apparatus adapted to convert solid thermoplastic feedstock material from a solid state to a molten state and subsequently dispense said molten material, said apparatus including

a barrel having a charging port,

a ram reciprocable relative to said barrel, said ram being adapted to force the feedstock toward the fore end of said barrel, and

a heater block generally shaped as a truncated cone located interiorly of said barrel at the fore end thereof, said cone being foreshortened from its vanishing point to create a blunt end tip, the axis of said truncated cone being aligned generally parallel to the axis of said barrel and being oriented in said barrel such that said blunt tip of said truncated cone faces said ram so as to provide initial thermal contact with the feedstock at said tip,

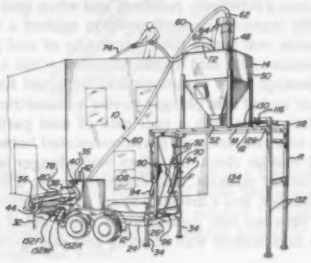
said truncated cone being truncated from its vanishing point to an extent sufficient to enable a consistent thermal gradient to be maintained along the axis of said heater block, and to enable the temperature of the truncated blunt end tip to be maintained at least at the melt point of the feedstock without substantially exceeding the melt point temperature of the feedstock at any point on the surface of the truncated cone so that melt rate of the feedstock is maximized without subjecting the feedstock to excessive temperature.

4,026,441
ROOF-GRAVEL REMOVAL APPARATUS

Richard C. Jones, 6950 Weiman Court, Commerce City, Colo. 80022

Filed Apr. 5, 1976, Ser. No. 673,981
Int. Cl.² B60P 3/00; B65G 65/52
U.S. Cl. 222—609 9 Claims

1. In combination: a wheel-supported bedframe having a front end and a rear end; a front frame section hingedly attached to the rear end of the bedframe for movement about a first transverse axis between a fully folded position resting atop thereof and a fully unfolded position in upstanding relation atop thereof; a midsection hingedly attached to the front end of the front frame section in offset relation to the latter so as to leave a gap therebetween when folded sized to receive a third frame section, said midsection being mounted for movement about a second axis paralleling the first axis between a fully folded position in spaced substantially parallel relation atop the front frame section and a fully unfolded position in right angular relation to the latter; a rear frame section hingedly attached to the rear end of the midsection for movement about a third axis paralleling the other two between an fully folded position tucked up flush against the underside of said midsection and a fully unfolded position resting on the ground, said front, mid and rear frame sections cooperating with one another in fully unfolded position and with the bedframe to define a free-standing archway; first hydraulic servomotor means connected between the bed frame and front frame section operative upon actuation to fold and unfold

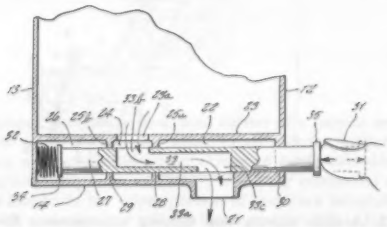


same; second hydraulic servomotor means connected between the front frame section and the midsection independently operable upon actuation to fold and unfold said midsection relative to said front frame section irrespective of the position of the latter; and, third hydraulic servomotor means connected between the rear frame section and the midsection independently operative upon actuation to fold and unfold said rear frame section relative to said midsection when the latter is in unfolded position.

4,026,442
HOUSEHOLD LIQUID DISPENSER

Horace L. Orton, c/o Gina M. Orton, 951 E. 228th St., Bronx, N.Y. 10466

Filed Dec. 15, 1975, Ser. No. 640,836
Int. Cl.² B67D 3/00
U.S. Cl. 222—181 1 Claim



1. A liquid dispenser for household use, comprising in combination, an upright, semi-cylindrical container having an opening at its upper end, a removable cover placed upon said container closing said opening, said opening communicating with a hollow interior within said container, a liquid placed through said opening into said interior said container comprising a flat rear wall and a rounded front wall integral at their lower ends with a horizontal bottom wall, an opening through said bottom wall, said opening communicating with a valve and said valve communicating with a downwardly dispensing spout, said valve comprising a housing integral with an underside of said bottom wall, said housing containing three chambers aligned along a horizontal row and separated by vertical partitions therebetween, a straight, horizontal plunger extending through openings in said partitions and into all three said chambers, a forward end of said plunger protruding through a forward opening through said front wall and outwardly thereof

for manual operation, a rear opposite end of said plunger bearing against one end of a compression coil spring contained within a rear of said chambers, an opposite end of said coil spring bearing against an inner side of said rear wall, a middle of said chambers communicating with said opening through said bottom wall, and a forward of said chambers communicating with said spout, said plunger having a generally Z-shaped passage extending transversely therethrough, both ends of said passage being contained within said forward compartment when said coil spring has freely pushed said plunger into a forwardly position; and when said plunger is in rearwardly manually pushed position against a force of said compression coil spring then a rear one of said passage ends communicates with said middle chamber while a forward one of said passage ends communicates with said forward chamber, a rear end of said plunger having a diametrically enlarged flange that abutts with a rear side of said partition located between said rear and said partition located between said rear and said middle chambers when said plunger is in said forwardly pushed position, said flange stopping a forward travel of said plunger, and a distance along a longitudinal axis of said plunger between said passage ends being equal to a distance between said bottom wall opening and said spout.

4,026,443

SLIDE CLOSURE ARRANGEMENT FOR CONVERTERS

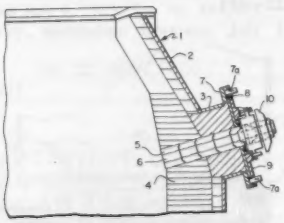
Ernst Meier, Kilchberg, Switzerland, assignor to Stopinc Aktiengesellschaft, Zug, Switzerland

Filed May 24, 1976, Ser. No. 689,150

Claims priority, application Germany, May 30, 1975, 2523928

Int. Cl.² B22D *41/08*

U.S. Cl. 222—600 **9 Claims**



1. A slide closure and tapping arrangement for tapping metallurgical vessels or furnaces, such as tipping converters, of the type including a metal shell, a tapping connection attached to said shell, a refractory lining within said shell, and a tapping duct extending through said lining to said tapping connection, said slide closure and taping arrangement comprising:

a radially outwardly extending flange attached to the outer end of said tapping connection;

a ring plate attached to said flange and forming a closure for said lining;

a slide closure frame positioned on said ring plate;

means on said flange for roughly aligning said frame in a desired operative position on said ring plate;

centering means on said ring plate for precisely aligning said frame in said desired operative position;

a preassembled slide closure unit positioned on said frame; and

means on said frame for aligning and attaching thereto said slide closure unit.

4,026,444

APPARATUS FOR FOLDING AND PRESSING GARMENTS

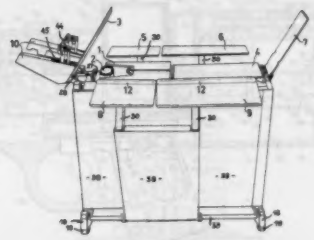
Osmo Viljam Harjapää, Boras, Sweden, assignor to AB Calator, Boras, Sweden

Filed Sept. 20, 1976, Ser. No. 724,878

Claims priority, application Germany, Sept. 19, 1975, 7529713[U]

Int. Cl.² A41H *33/00*

U.S. Cl. 223—37 **23 Claims**



1. Apparatus for folding and pressing garments such as shirts, comprising:

a stationary frame;

a stationary base plate mounted in said frame for supporting the garment, said base plate having a first end located to be near the collar end of a garment, a second end spaced from said first end and located to be toward the tail end of a garment, and spaced longitudinal sides extending between said ends;

a first movable plate pivotably associated with said frame adjacent to said first end for holding a garment on said base plate;

a second movable plate located within said frame adjacent to said second end for supporting the tail portion of a garment;

means for moving said second plate to a first position superposing said first plate to fold the tail portion of a garment toward its collar and returning said second plate to a second position essentially aligned with said base plate;

third and fourth movable plates pivotably associated with said frame along respective ones of said longitudinal sides, said third and fourth plates being located above said base plate, for folding side portions of a garment toward its center; and

a holding means removably associated with said second movable plate for holding the tail portion of a garment thereon.

4,026,445

BLOCKING BOARD

Gloria Poage, Rte. 7, Box 394, Roanoke, Va. 24018

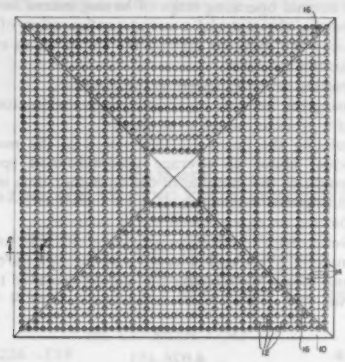
Filed June 1, 1976, Ser. No. 691,761

Int. Cl.² A41H *5/00*

U.S. Cl. 223—69 **14 Claims**

1. A blocking board comprising a board member having an upper surface and a lower surface with a plurality of openings extending through said board member from said lower surface to said upper surface, each opening including a first portion adjacent said lower surface having a first diameter and a second portion adjacent said upper surface having a second diameter less than said first diameter; and a plurality of pins,

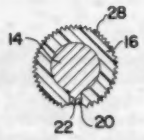
each pin having a head of a diameter to frictionally engage the sidewalls of said opening first portions when the head is inserted into the openings and having a shaft of a diameter freely passing through said opening second portions.



4,026,446
CLOTHES HANGER

Milton Kessler, c/o Kessler Products Co., Inc. 302 McClurg Road at Southern Blvd., Youngstown, Ohio 44501

Filed June 28, 1976, Ser. No. 700,567
Int. Cl.² A47J 51/094
U.S. Cl. 223—88 4 Claims



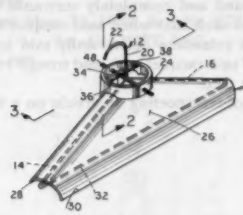
1. In a one piece round wire clothes hanger with a straight horizontal rung for draping garments thereover, a slit sleeve adapted to encircle said horizontal rung and detent means formed on said rung to prevent rotation of said sleeve on said rung, the improvement comprising: a flat parallel sided rib extending along the underside of said horizontal rung; said slit sleeve having edges which are flat and spaced apart the width of said flat sided rib to make surface to surface contact with the straight flat sides of said rib, the outer surface of said slit sleeve being uniformly serrated with longitudinally extending circumferentially arrayed sawteeth; and the interior surface of said sleeve being round and having an interior diameter substantially equal to the outside diameter of said horizontal rung.

4,026,447
COAT HANGER ATTACHMENT

Walter Wnek, 6000 Parkland Ave., Suitland, Md. 20028

Filed Apr. 9, 1976, Ser. No. 675,522
Int. Cl.² A47J 51/086
U.S. Cl. 223—98 1 Claim

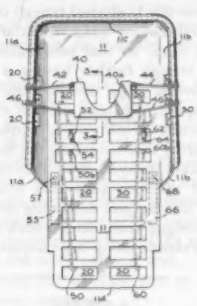
1. A pad attachment for a coat hanger having a pair of upwardly converging generally coplanar arms merging at a point of intersection into an upwardly projecting shank carrying a hook means at its upper end, said attachment comprising: a tubular collar for reception about said shank and the upper portions of said arms; a substantially rigid elongated skirt means projecting integrally downward from said collar and configured for covering said arms along the majority of their lengths; and a pin removably passing diametrically through said collar, and said pin being positioned to be located between the upper portions of said arms and adjacent the point of intersection of said arms for capturing said hanger in said attachment; a pair of spaced apart generally parallel planar webs integrally formed within said collar, said webs being positioned for receiving said shank and the upper portions of said arms therebetween, said webs being spaced for preventing said hanger from twisting relative to said attachment; said removably mounted pin passing generally perpendicularly through said webs.



4,026,448
BIKE CARRIER SLEEPER

Nathanial Henry Lewis, Box 20424, Los Angeles, Calif. 90006

Filed July 3, 1975, Ser. No. 593,068
Int. Cl.² B62J 11/00
U.S. Cl. 224—32 A 6 Claims



1. A sleeper, attachable to a child carrier of a bicycle and adapted to carry a child too small to sit without support, comprising a structure having an elongated back, two sides extending forwardly from said back, and a top connected to said sides and back, the upper portion of said back integrally formed with said sides and top, the lower portion of said back engaging a seat portion of the child carrier and attached thereto by mounting means which secure the sleeper on the child carrier, said sleeper also including means to stabilize the head of a child.

4,026,449
APPARATUS AND METHOD FOR CARRYING ARTICLES ON A TENNIS RACQUET

Ernest W. Kevin, 2728 60th SE., Mercer Island, Wash. 98040

Filed Nov. 10, 1975, Ser. No. 630,358
Int. Cl.² B65D 71/00
U.S. Cl. 224—45 L 5 Claims

1. A device for carrying an article on a tennis racquet comprising:

a generally U-shaped trough including a pair of spaced apart walls extending from opposite sides of a floor, said trough having a length greater than twice the diameter of a tennis ball, an inside width at a point adjacent the free longitudi-

nal edges of said trough being slightly less than the diameter of a tennis ball, and a height sufficient to accommodate the major portion of a tennis ball; and

a retaining tongue extending from a lateral edge of said trough, said tongue including an aperture adapted to extend around and completely surround the handle of said racquet such that when said racquet is carried with the racquet extending downwardly said tongue rests on the neck of said racquet with said trough extending along the racquet face.

5. A method of transporting an article on a tennis racquet, comprising:

providing a generally U-shaped trough containing said article, said trough having walls which are resiliently biased toward each other so that said walls forcibly grip said article, said trough further having a tongue projecting from a transverse edge thereof, said tongue having an aperture adapted to extend around and completely surround the handle of said tennis racquet; and

releasably securing said trough to the handle of said tennis racquet adjacent the neck thereof by inserting said handle through said aperture such that when said racquet is carried with the racquet extending downwardly one surface of said tongue contacts the neck of said racquet and said trough extends along the racquet face.

4,026,450
APPARATUS FOR TREATMENT OF ELONGATED FLEXIBLE MATERIAL

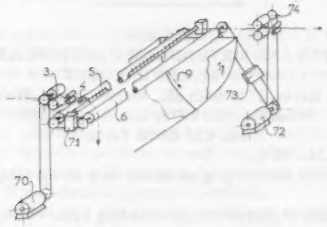
Marcel A. P. Giros, Route de Saint-Dizier, Ancerville, France (55170)

Continuation-in-part of Ser. No. 361,616, May 18, 1973, Pat. No. 3,951,322. This application Mar. 12, 1976, Ser. No. 666,198

Claims priority, application France, May 24, 1972, 72.19235

Int. Cl.² B65H *23/22*

U.S. Cl. 226—42 **18 Claims**



15. An apparatus for treatment of elongated flexible material in an elongated container filled with a treatment-fluid comprising:

a first normal operating stage of having means for:

imparting the material a coiled configuration of loops;

causing the loops to assume the shape of an elongated continuous helix;

imparting an entry speed to the material;

causing the helix to advance through the treatment-fluid at a predetermined level thereof;

regulating the linear advance speed of the material to equal about an average predetermined speed, the length of the material in the container thus increasing during said first stage;

imparting an egress speed to the material;

a second adjustment stage providing means to extract the material at the end of its advance through the container and means to decrease the ingress speed of the material.

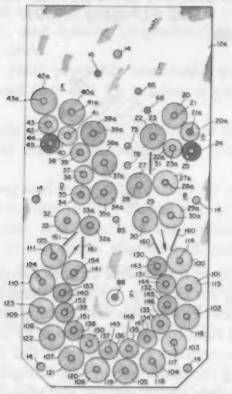
4,026,451
CONVEYOR APPARATUS FOR PROCESSING PHOTOGRAPHIC MATERIALS

Henry F. Hope, and Stephen F. Hope, both of 2548 Wyandotte Road, Willow Grove, Pa. 19090

Filed Oct. 30, 1975, Ser. No. 627,284

Int. Cl.² B65H *17/22*

U.S. Cl. 226—91 **8 Claims**



1. Apparatus for conveying an elongated web for turnaround in a confined space comprising

spaced frame members,

a plurality of web engaging rollers rotatably supported by said frame members,

said rollers comprising

a plurality of spaced outer rollers with their longitudinal axes disposed parallel to each other and in spaced relation outwardly of a curved turnaround path,

a plurality of spaced inner rollers with their longitudinal axes disposed parallel to each other and in spaced relation inwardly of a curved turnaround path,

a plurality of pairs of contiguous inner and outer rollers engaging the web and having a gap therebetween through which the web is directed and advanced toward an inner of the rollers of the next contiguous pair of inner and outer rollers for deflection into and through the gap of said next pair,

said pairs of contiguous inner and outer rollers being disposed so that a plane through the center of the turnaround path and the longitudinal axis of an inner roller is angularly disposed with respect to a plane

through the center of the turnaround path and the longitudinal axis of the outer roller, and

means for rotating said rollers.

4,026,452
MAGAZINE FOR STORING ZIGZAG FOLDED BELT MATERIAL

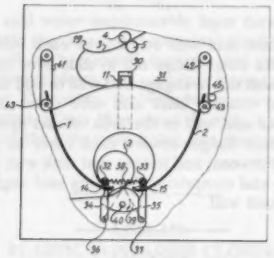
Hubertus Johannes van Megen, Arcen, Netherlands, assignor to Oce-van der Grinten N.V., Venlo, Netherlands

Filed Apr. 26, 1976, Ser. No. 680,194

Claims priority, application Netherlands, Apr. 28, 1975, 7505025

Int. Cl.² B65H 17/42

U.S. Cl. 226—119 **6 Claims**



1. In a magazine for receiving, storing and delivering portions of a continuous belt of flexible photoconductive sheet material prefolded in zigzag manner so that the successive sections thereof between the folds thereof are stackable one upon another, comprising two oppositely disposed upright guide walls defining therebetween a space for storing a stack composed of a large number of said sections disposed one upon another; an opening at the bottom of said walls for delivery of said belt; means for propelling said belt through said opening from the lower end of said stack; means engaging a portion of said belt at the top of said walls for depositing said belt onto said stack; said guide walls being spaced apart at an upper level of said space by a distance less than a length of each said section and having respective, oppositely disposed inner surfaces converging each toward the other, with each of said surfaces curved smoothly inwardly toward the center line of said space, from said upper level downward to lower end portions of said surface at the level of said delivery openings, so that said sections may be stacked in said space in upwardly bowed postures with their respective folds disposed on opposite portions of said inner surfaces and will be increasingly bowed upwardly as their respective folds progress downwardly on said surfaces, and means for positioning successive folds of said belt downwardly along opposite portions of said inner surfaces as the folds are deposited in said space, so that each belt section between two successive folds will be laid in upwardly curved posture upon a stack of said sections bowed upwardly in said space, the improvement wherein said means for positioning said belt portions comprise carrier members mounted near the upper ends of said guide walls and having inside said walls respectively downwardly movable surface portions located across the paths of and for engaging with successive folds of the entering belt length and means for positively driving said carrier members and thereby continuously moving said surface portions downwardly so as to carry folds engaged with them downward adjacent to said walls and lay the respective belt sections between such folds into place on underlying belt sections.

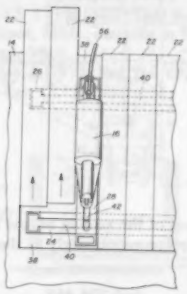
4,026,453
VARIABLE WORK STATION FOR PNEUMATIC STAPLING APPARATUS

Martin Davison, and Clement G. Gathwright, both of Baltimore, Md., assignors to Western Coat Pad Company, Baltimore, Md.

Filed Mar. 31, 1976, Ser. No. 672,207

Int. Cl.² B27F 7/02

U.S. Cl. 227—109 **6 Claims**



1. A variable work station for staple basting pieces of material together utilizing stapling guns mounted on said work station, the work station comprising:

a planar work surface having a portion thereof cut away over at least one perimetric edge thereof to define a recess;

a plurality of block members having upper planar surfaces adapted to removably fit into the recess in said work surface;

means for supporting the block members in the recess, said support means holding the block members at a disposition relative to the work surface such that said upper planar faces of said block members are co-planar with the work surface and define a portion thereof;

at least one support member mounting one of the stapling guns, the support member being insertable into a space provided by removal of one of the block members from the recess, the mounting surface of the stapling gun being co-planar with the work surface; and,

means for actuating the stapling gun to staple baste the pieces of material together.

4,026,454
NAILING MACHINES

Jack Coe, Birstall, and Graham Frederick Price, Leicester, both of England, assignors to USM Corporation, Boston, Mass.

Filed Apr. 26, 1976, Ser. No. 680,577

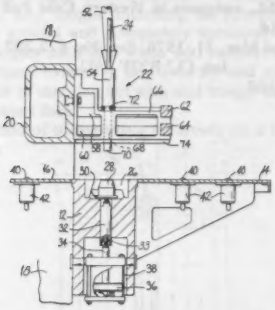
Claims priority, application United Kingdom, May 8, 1975, 19323/75

Int. Cl.² B27F 7/02

U.S. Cl. 227—151 **8 Claims**

1. Nailing apparatus for use in making cable reel flanges or the like comprising a work support table having a support surface on which a workpiece having portions which require nailing can be supported, nailing means operable to insert nails into a portion of a workpiece supported on said surface of the work support table, a rotatable element having a work-supporting surface and a work-engaging projection extending from the work-supporting surface, the rotatable element being housed in the work support table, and means for raising the element into a position in which the work-supporting surface

thereof supports the workpiece and said projection provides a rotatable center about which the workpiece can be turned



between operations of the nailing means to present said portions of the workpiece successively to the nailing means.

4,026,455

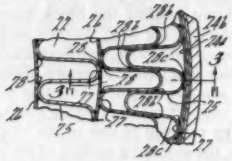
METHOD OF MANUFACTURING AND OPERATING A REGENERATOR FOR GAS TURBINE ENGINE

George J. Huebner, Bloomfield Hills, and James H. Whitfield, Royal Oak, both of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Division of Ser. No. 334,554, Feb. 22, 1973, Pat. No. 3,897,819. This application Feb. 10, 1975, Ser. No. 548,509

Int. Cl.² B21D *53/02*

U.S. Cl. 228—118 **20 Claims**



1. In the method of fabricating a rotatable gas turbine regenerator of the type comprising a drum type matrix having a peripheral rim and adapted during engine operation to effect an axial temperature gradient between axially opposed hot and cold faces of said matrix, the process of providing radially inner and outer sealing members for securing said rim to said matrix at a fluid seal to prevent gas flow circumferentially therebetween and for accommodating cyclic forces tending to rupture said seal, arranging said sealing members circumferentially between said matrix and rim and interfitting said members for radially sliding fluid sealing relationship throughout the major axial extent thereof measured from said hot face, securing one of said members to said rim and the other to said matrix, and securing said members together throughout the remaining minor axial extent of said matrix to prevent said radially sliding relationship thereat.

4,026,456

METHOD OF ATTACHING A TUBE TO A WALL

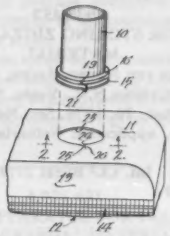
Leo A. Lema, Racine, Wis., assignor to Modine Manufacturing Company, Racine, Wis.

Filed Jan. 15, 1976, Ser. No. 649,567

Int. Cl.² B23K *31/02*

U.S. Cl. 228—136 **6 Claims**

1. The method of attaching a tube to a wall in a fluid tight seal, comprising: providing a said tube having outer and inner end flanges spaced apart to define a groove therebetween substantially equal in width to the thickness of said wall with the outer end flange having a slit defining adjacent outer flange end portions one of which is arranged at an outward angle to provide an angled tab; providing a tube receiving opening in said wall with a slit defining adjacent wall end portions one of which is arranged at an outward angle similar to said angled flange tab to provide a similar wall tab complementary to said flange tab; aligning said tube and opening coaxially with the outer tube flange in contact with said wall;



rotating said tube and wall relative to each other thereby causing said tube outer flange tab to slide over said wall tab and enter said wall slot to engage said wall to said tube groove; continuing said rotating until said tube outer flange completely underlies said wall in the area of said opening; compressing said tube flanges toward each other to grip tightly said wall therebetween; and joining said tank wall and flanges in a fluid tight seal comprising flattening said angled tabs on said tube and said wall.

4,026,457

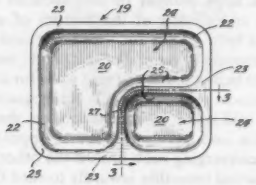
TRAY WITH RAISED DIVIDERS

John C. Schubert, Chippewa Falls, Wis., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Filed June 30, 1976, Ser. No. 701,290

Int. Cl.² B65D *1/34, 51/20*

U.S. Cl. 229—2.5 R **6 Claims**



1. A tray having a base, outside walls, a first surface comprising top surfaces of said outside walls, and an interior divided into self-contained compartments by a plurality of divider walls having a second surface comprising top surfaces of said divider walls, wherein the improvement comprises having said second surface progressively projecting above said first surface.

4,026,458

DEEP DRAWN PAPERBOARD CONTAINER AND PROCESS FOR MAKING IT

Jerald A. Morris, Marion, Ind., and John C. Siegele, New City, N.Y., assignors to International Paper Company, New York, N.Y.

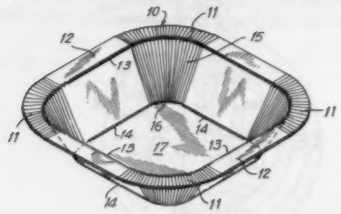
Filed Mar. 27, 1975, Ser. No. 562,810

Int. Cl.² B65D *5/20*

U.S. Cl. 229—30 **14 Claims**

1. A deep drawn paperboard container for food comprising a coated paperboard substrate deep drawn into the shape of a container, said paperboard substrate comprising bleached

virgin sulphate or sulphite pulp or mixtures thereof and having a thickness of at least about 15 caliper, a basis weight of about 50 lbs/1000sq. ft. to 110 lbs/1000 sq. ft.; a tensile strength of about 70 to 190 lbs/in. in the machine direction and about 40 to 100 lbs/in. in the cross direction, and a Taber V-5 stiffness of from about 100 to 780 Taber units in the machine direction and about 50 to 350 Taber units in the cross direction, said paperboard substrate having affixed thereto a water impermeable layer, said water impermeable layer forming the inside surface of said container, said container comprising a bottom and side walls with rounded corners, said rounded corners containing folded pleats, said container having a depth greater than about 1.375 inches, the rounded corners of the bottom having a radius of less than about ⅞ inch, and the angle of inclination of the side walls being less than about 20° from vertical.

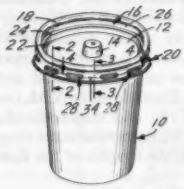


4,026,459

PLASTIC CONTAINER CLOSURE

Richard Lewis Blanchard, Barrington, Ill., assignor to American Can Company, Greenwich, Conn.

Filed June 19, 1975, Ser. No. 588,499
Int. Cl.² B65D *43/10, 51/16*
U.S. Cl. 229—43 **6 Claims**



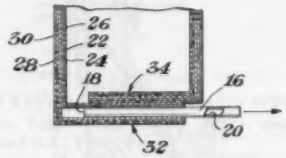
1. A closure of thin, flexible plastic construction adapted for interference mounting upon the rim of a container, comprising a panel, and an upstanding peripheral brim extending thereabout, said brim including an upwardly extending inner wall portion adjacent said panel, a top wall portion extending outwardly from the upper part of said inner wall portion, and an outer wall portion depending from the outer part of said top wall portion, with said inner, top and outer wall portions defining a downwardly-opening channel about said panel within said brim, said outer wall having on its inner surface a series of discrete, peripherally extending and peripherally spaced compound protuberances providing a discontinuous bead spaced downwardly from said top wall, each of said protuberances including a substantially rectilinear, peripherally elongated and inwardly projecting base protrusion, and a narrower, substantially rectilinear, peripherally elongated ridge protrusion disposed substantially within said base protrusion and projecting further inwardly into said channel therefrom, said protuberances and the portions of said outside wall therebetween being dimensioned and configured to permit one of said protuberances to be disengaged from the rim of a container on which said closure is mounted without displacement of the adjacent protuberances therefrom.

4,026,460

VALVE TYPE SHIPPING BAG

James A. May, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed May 3, 1976, Ser. No. 682,825
Int. Cl.² B65D *31/14*
U.S. Cl. 229—62.5 **10 Claims**



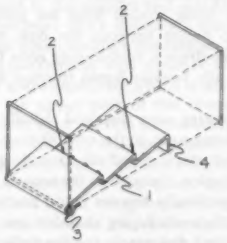
1. A valve fill type shipping bag having top, bottom, ends and sides comprising multi-ply walls including a vapor barrier ply sandwiched between gas permeable wall plies, closable filling valve means, and sealable gas venting means extending between said vapor barrier ply and those gas permeable plies which are between the interior of the bag and said vapor barrier ply, said venting means communicating with the exterior of said bag.

4,026,461

NEWSPAPER SUPPORT INSERT

Joel W. Hodge, 208 Riverview Court, Elizabethton, Tenn. 37643

Filed June 29, 1976, Ser. No. 700,918
Int. Cl.² B65D *91/00*
U.S. Cl. 232—17 **5 Claims**

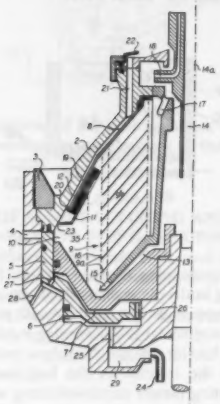


1. A readily insertable newspaper support for insertion into a newspaper delivery tube of one piece, elongated, hollow body construction open at one end and closed at the other; which support comprises a corrugated wedge surface of about one-half the length of the tube having a reversely turned forward clamp means to engage the lower surface of the open end of the tube and at least one drainage hole at each trough of the corrugated surface.

4,026,462
SEPARATING DRUM FOR THE CENTRIFUGAL TREATMENT OF MIXTURES

Aloys Tenthoff, Oelde, and Tonius Schulze Schwicking, Ostenfelde, both of Germany, assignors to Westfalia Separator AG, Oelde Westfalen, Germany

Filed Jan. 19, 1976, Ser. No. 650,577
Claims priority, application Germany, Feb. 1, 1975, 2504226
Int. Cl.² B04B 11/06
U.S. Cl. 233—29 4 Claims



1. A centrifugal separator suitable for separating a three component mixture of a specifically lighter liquid fraction, a specifically heavier liquid fraction, and a solids fraction, into said three components comprising:

a. a separating drum having an inlet for the mixture disposed adjacent the drum axis, and a disk stack of radially extending disks adjacent the drum axis defining a first separating zone for separation of the specifically lighter fraction, and means defining a passageway for removal of the separated specifically lighter fraction from the drum, the disk stack being spaced from the periphery of the drum so as to define between the disk stack and the periphery of the drum a centrifuging zone for separation of the specifically heavier liquid fraction and the solids fraction,

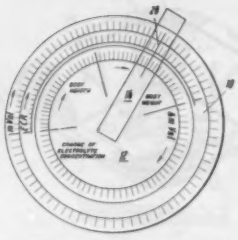
b. a second separating zone disposed radially outwardly of the first separating zone, in the centrifuging zone, defined by a second disk stack of radially extending disks, means defining distribution channels in the second disk stack for entrance of specifically heavier liquid fraction and solids fraction from the centrifuging chamber into and distribution in the second disk stack, the inwardly disposed end and outwardly disposed end of the second disk stack being open for, respectively, discharge of specifically lighter liquid fraction adjacent the first disk stack, and discharge of specifically heavier liquid fraction and solids fraction into the centrifuging zone, and

c. means defining a passageway for removal of specifically heavier liquid fraction from the centrifuging zone, having an inlet for specifically heavier liquid fraction adjacent the outwardly disposed end of the second disk stack.

4,026,463
CIRCULAR SLIDE RULE SUITABLE FOR USE IN DETERMINING THE ELECTROLYTE DEFICIENCY IN INFUSION THERAPY

Hermann Betzler, Homburg, Saar, Germany, assignor to Salvia-Werk Gesellschaft m.b.H., Homburg, Saar, Germany

Filed Oct. 2, 1975, Ser. No. 618,806
Int. Cl.² G06C 3/00
U.S. Cl. 235—88 R 6 Claims



1. A calculating disc for determining the electrolyte deficiency (mVAL) in the extracellular space (ECR) from the measured electrolyte deficiency per liter of serum (ΔmVAL), body weight (kg) and body size (cm) comprising a base disc, a first dial mounted in central and rotary manner on one side of the base disc and having a smaller diameter than said base disc, a second dial mounted centrally and in rotary manner on the side of the base disc opposite to the first dial and having a smaller diameter than said base disc, a first and second substantially straight pointers made from transparent material and having radial stroke markings and extending over the peripheral edge of the base disc, mounted respectively in rotary manner on said first and second dials the ends of the two pointers projecting over the periphery of the base disc being interconnected, first, second and third scales on said first and the said second dials having in each case a different scale length with the same radii and when engaged with another forming a complete scale of 360° , the scale lengths of the first and second scales on each dial relative to one another behaving in the same way as the difference values of the logarithms of the particular minimum and maximum scale readings of the first scales on the one hand and the second scales on the other, and a fourth scale (mVAL) on the peripheral edge of base disc (**10**) and concentrically within the fourth scale a fifth scale (ECR), whose scale length is proportional to the sum of the scale lengths of the first and second scales.

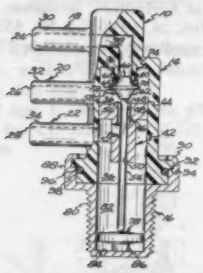
4,026,464
DUAL FUNCTION THERMAL VALVE

John Doherty, Jr., Assonet, Mass., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 18, 1975, Ser. No. 641,795
Int. Cl.² G05D 23/10
U.S. Cl. 236—48 R 12 Claims

12. A thermally responsive control mechanism comprising a housing, a control member mounted on the housing for movement between first, second, and third control positions, means biasing said control member for movement relative to the housing from said first control position toward said second and third control postions, first and second thermally responsive, bimetallic, dish-shaped members each having a peripheral portion of selected configuration, said first dish-shaped member being movable with snap-action from an original dished configuration to an inverted dished configuration when heated through a first temperature range and from said inverted dished configuration to said original dished configuration when subsequently cooled through said first temperature range, said second dish-shaped member being movable with snap-action from an original dished configuration to an in-

verted dished configuration when heated through a second temperature range and from said inverted dished configuration to said original dished configuration when subsequently cooled through said second temperature range, and carrier means engaging said peripheral portions of said dish-shaped members securing said dish-shaped members in spaced facing relation to each other to form an actuator assembly, said



acutator assembly being movably mounted in said housing with one of said dish-shaped members engaging said control member and the other of said dish-shaped members engaging said housing to successively position said control member in said first, second, and third control positions when said dish-shaped members are heated from a temperature below said first temperature range to a temperature above said second temperature range.

4,026,465

TEMPERATURE-SENSITIVE SNAP-ACTION VALVE

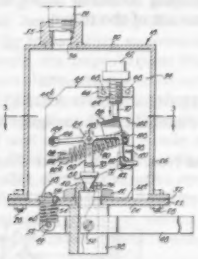
Thomas M. Kenny, Paoli, Pa., assignor to Ogontz Controls Company, Inc., Willow Grove, Pa.

Division of Ser. No. 514,428, Oct. 15, 1974, abandoned, which is a division of Ser. No. 472,095, May 22, 1974, Pat. No. 3,857,446. This application June 16, 1976, Ser. No. 696,755

The portion of the term of this patent subsequent to Dec. 31, 1991, has been disclaimed.

Int. Cl.² G05D *23/10*

U.S. Cl. 236—48 R **1 Claim**



1. A temperature-sensitive snap-action valve comprising a base, a fluid conduit connected with said base, a ball valve in said fluid conduit for controlling flow therethrough, a valve stem extending from said ball valve, gear means connected to said valve stem, a temperature-sensitive actuator mounted on said base, and a spring linkage assembly operatively connecting said actuator with said ball valve, said spring linkage assembly comprising a valve member pivotally mounted on said base, an arcuate gear-toothed portion of said valve member having its axis concentric with the pivot axis of said valve member, said gear toothed portion being cooperatively engaged with said valve stem gear means whereby pivotal movement of said valve member produces rotational movement of said valve stem and an opening or closing movement of said ball valve, an actuator member pivotally mounted on said base for rotation about an axis spaced from and parallel to the pivot axis of said valve member, said actuator operatively engaging said actuator member to provide rotation of said actuator member in response to temperature variations, and a tension spring having one end thereof attached to said actuator member at a point remote from its pivot axis, the opposite end of said spring being connected to said valve member at a point remote from its pivot axis, said spring urging said actuator member in rotation toward said actuator, said spring normally urging said valve member in rotation to hold said ball valve in a fully opened or fully closed position, said spring passing over center upon a predetermined temperature condition to urge said valve member in the opposite rotational direction, thereby fully closing or opening said ball valve with a snap action.

4,026,466

SYSTEM FOR FASTENING A RAIL TO ITS SUPPORT

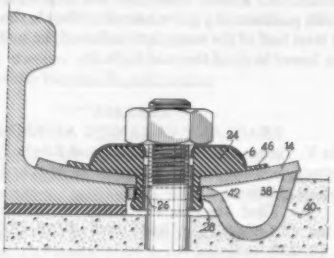
Michel Duchemin, Lambres les Douai, France, assignor to Ressorts du Nord S.A., Paris, France

Filed Nov. 18, 1975, Ser. No. 632,977

Claims priority, application France, Nov. 29, 1974, 74.39300

Int. Cl.² E01B *9/30*

U.S. Cl. 238—349 **18 Claims**



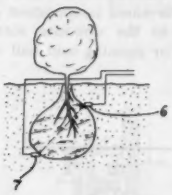
1. A system for fastening a rail having a flange, the system comprising in combination: a rail support, a fastener including an elastically bendable strip having an upper face, one end portion bearing downwardly on the flange and another end portion supported by the support, the strip defining an aperture, clamping means having an upper part and a lower part which is anchored in the support and extending through said aperture, an elastomer block defining a substantially central aperture through which aperture the clamping means extends, the block being coextensive with a part of said upper face of the strip, and a cup-shaped cap which is interposed between the block and the upper part of the clamping means and comprises an outer skirt portion surrounding and in contact with the block for laterally retaining the block and an inner tubular sleeve portion which defines a central aperture and extends into the aperture of the block and surrounds the clamping means, the block being coextensive with the cap in the compressed condition of the block, the strip being more deformable elastically than the cap by the effect of the clamping means and being in an elastically deformed condition in the system in use while the cap is substantially undeformed by the effect of the clamping means, the cap being spaced from the upper face of the strip when the block is compressed and the strip is elastically deformed by the effect of the clamping means, and the nature of the pressure transmitted by the compressed block to the upper face of the strip being substantially hydrostatic owing to said lateral retention of the block by said skirt portion.

4,026,467

IRRIGATION CONTROL APPARATUS

Charles J. M. Aymé de la Chevreliére, 21, Avenue de Madrid, Neuilly-sur-Seine, France

Filed Apr. 12, 1976, Ser. No. 674,511
Claims priority, application France, Apr. 11, 1975, 75.11340
Int. Cl.² A01G 27/00; B05B 12/12
U.S. Cl. 239—63 1 Claim



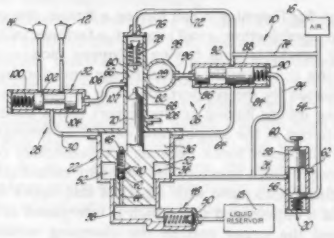
1. An improved irrigation control apparatus, comprising an assembly electrically controlling the starting and stopping of an irrigation installation through the agency of two electrodes measuring the electrical resistance of the soil, the said two electrodes being simultaneously spaced from one another laterally and vertically, the improvement comprising an upper electrode placed at a point which is laterally offset with respect to the axis of symmetry of the bulb formed by drop by drop irrigation, at a distance equal to at least half of the maximum radius of the bulb and situated at the upper limit of the said bulb; and a lower electrode disposed in a diametrically opposite position, at a point laterally offset in the inverse sense by at least half of the maximum radius of the bulb and situated at the lower limit of the said bulb.

4,026,468

HEADLAMP CLEANING ASSEMBLY

David V. Tinder, Madison Heights, and Edwin F. Clemett, Jr., Detroit, both of Mich., assignors to McCord Corporation, Detroit, Mich.

Filed Aug. 14, 1975, Ser. No. 604,645
Int. Cl.² B05B 1/08; B60S 1/46; F15B 11/20, 13/02
U.S. Cl. 239—66 17 Claims



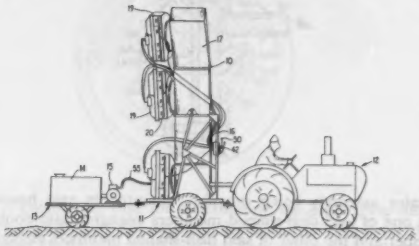
1. A headlamp cleaning assembly for cleaning vehicle headlamps comprising: first and second nozzles for jetting an air/liquid mixture against a headlamp surface; and regulator means for mixing air and liquid and for sequentially supplying the resultant air/liquid mixture to said first nozzle for a first period of time and then to said second nozzle for a second period of time during one complete cycle; and control means for actuating said regulator means to initiate each of said cycles, said regulator means including air/liquid mixing means movable between a start position and a liquid charged position, energy transfer means for moving said mixing means from said start position to said liquid charged position in response to actuation of said control means, and air supply means for supplying air to said air/liquid mixing means for the mixture thereof with liquid in response to said mixing means reaching said charged position and for moving said mixing means from said charged position to said start position.

4,026,469

APPARATUS FOR SPRAYING BUSHES AND TREES

Harry Frankel, Savyon; Haim Levit, Sde - Varbourg, and David Nahir, Bat-Yam, all of Israel, assignors to The State of Israel, Ministry of Agriculture, Jerusalem, Israel

Filed Feb. 26, 1975, Ser. No. 553,076
Claims priority, application Israel, Feb. 27, 1974, 44307
Int. Cl.² B05B 9/06
U.S. Cl. 239—78 21 Claims



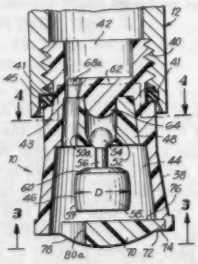
1. Apparatus for spraying trees and especially citrus trees comprising a mobile source of pressurized air adapted to be propelled along a path parallel to a row of trees to be sprayed and including a plenum chamber for maintaining a generally constant air pressure therewithin during operation; at least one nozzle connected to said plenum chamber and having a throat in the form of a vertically oriented slit producing a substantially continuous sheet-like air blast whose principle plane is substantially vertically oriented; means associated with the slit for oscillating the principle plane of the air blast back and forth about a substantially vertical axis through such an angle and at such a frequency as to impart an oscillatory movement to the leaf structure within the air blast thereby exposing opposite surfaces of the leaves to the blast; and a sprayhead associated with each nozzle out of the path of the air blast for spraying atomized liquid into the air blast at a location downstream of the throat.

4,026,470

SHOWER FLOW MODULATOR

Buckley Crist, Plainfield, N.J., assignor to Jaclo, Inc., Brooklyn, N.Y.

Filed Nov. 14, 1975, Ser. No. 631,879
Int. Cl.² B05B 3/14
U.S. Cl. 239—102 20 Claims



1. A shower flow modulator for varying the intensity and direction of fluid flow exiting from the modulator comprising a housing, a chamber defined in said housing, means for directing a stream of fluid into said chamber, a hydrodynamically-shaped member disposed for movement within said cham-

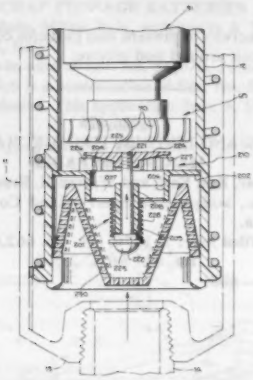
ber, said hydrodynamically-shaped member shaped so that fluid flowing over said member creates an attractive force which causes said member to be initially attracted into said fluid stream and thereafter creates a repellent force which causes said member to be repulsed from said fluid stream thereby varying the intensity and direction of fluid flow exiting from said chamber.

4,026,471

SPRINKLER SYSTEMS

Edwin J. Hunter, Rancho Santa Fe, Calif., assignor to The Toro Company, San Marcos, Calif.

Filed Apr. 1, 1976, Ser. No. 672,661
Int. Cl.² B05B *15/10, 3/04*
U.S. Cl. 239—206 **22 Claims**



1. In a sprinkler having a head mounting a nozzle for dispersing fluid through said head and out of said nozzle and impeller means associated with said head operatively engaging said nozzle for rotating said nozzle in response to said fluid passing through said head, said impeller means including transmission means for transmitting movement of said impeller means to said nozzle, the improvement which comprises:

nozzle rotation control means associated with said impeller means for rotating said nozzle at a substantially constant rate of rotation regardless of the flow rate of fluid being dispersed out of said nozzle, said nozzle rotation control means including fluid directing means for directing fluid flow to said impeller means, and valve means for varying the flow rate of fluid through said fluid directing means to maintain a substantially constant velocity flow rate for changing volume flow rates of fluid flowing to said impeller means.

4,026,472

CONVERGENT-DIVERGENT PLUG NOZZLE

George R. Rabone, Cincinnati, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 512,416, Dec. 8, 1965, abandoned. This application Nov. 12, 1968, Ser. No. 778,377
Int. Cl.² B64D *33/04*
U.S. Cl. 239—127.3 **3 Claims**

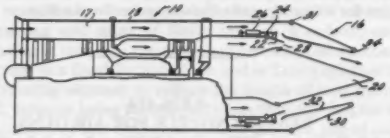
1. In a gas turbine engine including means for suppressing infrared radiation from the interior of said engine, said means comprising,

a propulsive nozzle including an inner plug having a longitudinal section which deverges from a first diameter at the nozzle inlet to a maximum diameter and converges therebeyond;

a casing surrounding said plug and forming a duct concentric with said plug;

flap means pivotally connected to said casing and forming an extension thereof;

said plug, casing, duct and flap means defining an annular nozzle coverging to a throat and diverging therebeyond wherein in a subsonic flight the flap means are disposed convergently with respect to each other and form in combination with the plug a flow path of minimum divrgence for the hot gas stream, and at supersonic flight speeds are displaced outwardly to form a flow path of maximum divergence with respect to said plug; p1 said flap means including a plurality of main flaps defining



said throat and a plurality of secondary flaps, said secondary flaps comprising inner and outer wall members, said outer wall members being pivotally connected to the downstream end of said casing and said inner wall members being pivotally connected to the downstream end of said outer wall members, said inner and outee wall members forming a cavity therebetween;

said nozzle including means for causing the downstream ends of said outer wall members in said subsonic flight conditions to have a dimaeter no greater than the said maximum diameter of said plug;

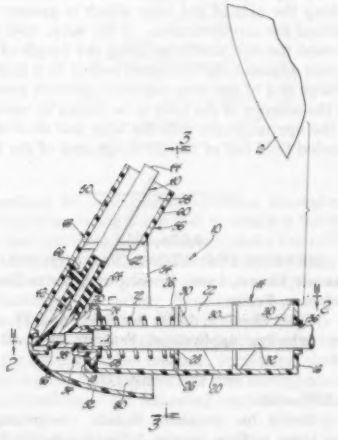
said nozzle thereby effectively suppressing infrared radiation from the interior fo said engine.

4,026,473

HEADLAMP CLEANING ASSEMBLY

David V. Tinder, Madison Heights, and Walter E. Mack, Livonia, both of Mich., assignors to McCord Corporation, Detroit, Mich.

Filed Oct. 20, 1975, Ser. No. 623,798
Int. Cl.² B05B *1/10, 3/14;* B08B *3/02*
U.S. Cl. 239—229 **11 Claims**



1. An assembly for directing fluid toward a surface comprising: a support portion adapted at a first end to be supported by structure and extending to a second end, a cage portion extending from said second end and in a direction transverse to

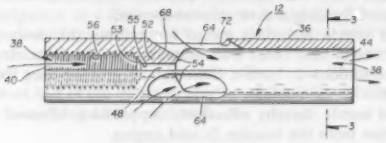
said support portion, a flexible tube having an emitting end for emittting fluid and for flailing in response to such emission of fluid from said emitting end, said cage portion defining an opening surrounding said tube and in spaced relationship thereto for restricting the flailing movement of said tube to the confines of said opening, an integral elbow member supported by one of said portions and having an inlet passage and an outlet passage extending transversely thereto, said tube being in fluid communication with said outlet passage, said elbow member including support flanges extending laterally therefrom with each support flange having an aperture therein, a fastener clip disposed over each support flange with a thread-receiving aperture therein and aligned with said aperture in said support flange, and fastening means associated with said clips for securing said elbow member in position.

4,026,474

VENTURI NOZZLE FOR AIR GUNS

Ralph H. Knauer, Clifton, and William R. Rohrbach, Lincoln Park, both of N.J., assignors to Western Electric Company, Inc., New York, N.Y.

Filed Jan. 22, 1976, Ser. No. 651,383
Int. Cl.² B05B *7/30*
U.S. Cl. 239—430 **7 Claims**



1. In a venturi fluid discharge nozzle, an elongated, cylindrically shaped tube having a restricted orifice formed in a fluid receiving end thereof through which a compressed gaseous fluid is passed into a fluid discharge end thereof, the fluid flow area of the discharge end of the tube being greater than the fluid flow area of the orifice to allow expansion of the fluid exiting the orifice in a region of the discharge end of the tube adjacent the orifice, the tube having a plurality of elongated apertures situated at nondiametrically opposed positions around the periphery of the tube, each said aperture having a length along the axis of the tube which is greater than the width around the circumference of the tube, said apertures being formed through said tube along the length of the tube from a point adjacent the restricted orifice to a point toward the discharge end of the tube to permit ambient gaseous fluid adjacent the exterior of the tube to be drawn by venturi effect through the apertures and into the tube and discharged with the expanded fluid out of the discharge end of the tube.

4,026,475

DEVICES FOR ATOMIZING LIQUIDS

Jean-Francois Vicard, Lyon, France, assignor to Societe Lab, Villeurbanne, France

Filed Mar. 15, 1976, Ser. No. 666,537
Claims priority, application France, Mar. 21, 1975, 75.09566
Int. Cl.² B05B *1/34*
U.S. Cl. 239—468 **7 Claims**

1. In a device for atomising liquids, comprising a body having an inner surface, means defining a generally annular groove in said inner body surface, said groove having at least one circular edge, inlet means in said body for injecting liquid tangentially into said groove, and means for causing liquid flowing along said groove to overflow over said circular edge to form a conical spray of fine liquid droplets, the improvement which comprises deflector means on said body for deflecting solid particles flowing along said groove away from

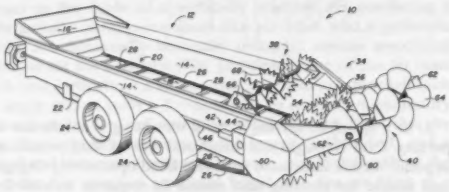
said groove thereby to prevent said particles completing more than one circuit around said groove.

4,026,476

SPREADING AND DISTRIBUTING MECHANISM FOR A MANURE SPREADER

Albert J. Ipnar, East Earl, and Warren H. Brackbill, Paradise, both of Pa., assignors to Sperry Rand Corporation, New Holland, Pa.

Filed Mar. 1, 1976, Ser. No. 662,680
Int. Cl.² A01C *23/00*
U.S. Cl. 239—680 **11 Claims**



1. In a manure spreader of the type having an open end spreader box mounted on a wheeled frame, a conveying device operable with said box for conveying material placed within said box rearwardly toward the open end of said box, the improvement comprising in combination therewith:

a. a main beater having a rotatable shaft mounted transversely between the sidewalls of said box in the vicinity of said open end, said main beater having a series of saw-toothed paddles arranged such that upon rotation thereof said paddles engage and shred said material as it is advanced rearwardly by said conveying device, the shredded material being directed over the top of said main beater and rearwardly thereof;

b. a wide spread distributor beater having a rotatable shaft with a series of distributor blades arranged thereon, said wide spread distributor shaft is positioned upwardly and rearwardly from said main beater shaft such that a plane passes through the axes of said main and distributor shafts at an angle within a range between 40°–60° with respect to a horizontal plane that passes through said main beater shaft whereby said wide spread distributor beater is positioned in the path of said material discharged from said main beater such that the main flow of said material strikes the marginal edge portion of said distributor blades of said wide spread distributor beater when said distributor blades are located within the upper forward quadrant of a cylindrical zone defined by the rotation of said wide spread distributor beater to thereby spread said material rearwardly and to the sides of said spreader such

that said material is evenly distributed over the ground; and

c. drive means for rotating said main beater and said wide spread distributor beater in the same directions and such that said wide spread beater rotates 30–50 percent faster than the rotation of said main beater to impart an increased momentum to said material as it is discharged by said wide spread distributor beater thereby effecting a wide spread pattern of the shredded material over the ground.

4,026,477

PROCESS FOR THE SEPARATION OF COMPONENTS OF SCRAP STORAGE BATTERIES

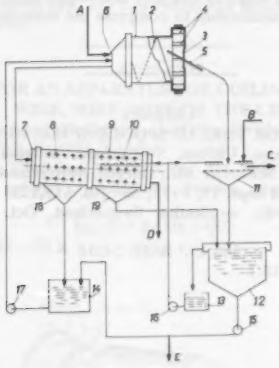
Gustavo Tremolada, Milan, Italy, assignor to A. Tonolli & Co. S.p.A., Milan, Italy

Continuation-in-part of Ser. No. 56,070, June 26, 1970, abandoned, which is a continuation of Ser. No. 516,396, Dec. 27, 1965, abandoned. This application June 9, 1972, Ser. No. 261,398

Claims priority, application Italy, Jan. 15, 1965, 796/65

Int. Cl.² B02C *21/00*

U.S. Cl. 241—17 **5 Claims**



1. A process for the separation of scrap lead storage batteries and parts thereof in three parts, namely metallic components, paste and inactive material, essentially comprising:

emptying from the batteries their sulphuric acid content; then crushing the batteries into pieces of sizes between 2 and 15 cm, apart from the paste which is detached;

heating the pieces and paste at 35°–50° C, while tumbling them, until the paste reaches a humidity content of 2–7%, thereby neutralizing the residual acidity of the paste;

then separating and recovering the dry paste from the materials from the preceding step by dry screening said materials using a screen having openings of size in the range of 2 to 30 mm;

then feeding the residual material, substantially free of paste, into a separating zone containing an aqueous suspension of the paste, and having a density from 10 to 100% greater than that of the battery containers, and a pH regulated between 7 and 10, the pH and viscosity of the suspension being regulated by addition of sulphuric acid;

removing as sink the metallic components and as float the inactive material;

draining and washing the sink and float respectively, and recirculating the suspension of paste at the proper density to the separating zone.

4,026,478

PROCESS FOR MAKING UNIFORM SHORT NON-CELLULOSIC FIBERS

Frank D. Albert, Clearwater; Alan P. Conroy, Tampa, and David L. Skinner, St. Petersburg, all of Fla., assignors to Jim Walter Corporation, Tampa, Fla.

Filed Apr. 3, 1975, Ser. No. 564,731

Int. Cl.² B02C *23/10;* **C03B** *37/00*

U.S. Cl. 241—24 **3 Claims**

1. The method of producing inorganic fibers within a preselected narrow range of aspect ratios from about 30 to about 140 comprising the steps of making a mass of individual, inorganic fibers having diameters within a prescribed range and having a range of aspect ratios substantially from 10^3 to 10^6, said mass further having not less than about 7% shot by weight; putting said mass of fibers through a refiner, said refiner having at least one rotating plate element and a second plate element at a fixed distance from and in facing relation to said one rotating element to reduce the length of said fibers, said fixed distance being substantially less than the lengths of a major quantity of said fibers and greater than the size of said shot and subjecting said refined fibers to the action of a separator whereby fibers with said preselected narrow range of aspect ratios are produced with less than 1% shot.

4,026,479

METHOD AND SYSTEM FOR MAINTAINING OPTIMUM THROUGHPUT IN A GRINDING CIRCUIT

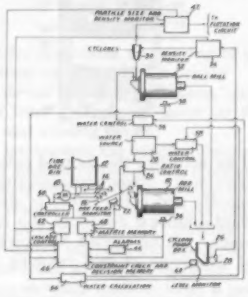
Ronald G. Bradburn; Brian C. Flintoff, both of Peachland; Robert A. Walker, Kelowan, and Walter A. Dutton, Dollard des Ormeaux, all of Canada, assignors to Brenda Mines Ltd., Peachland, Canada

Filed Mar. 18, 1976, Ser. No. 668,075

Claims priority, application Canada, Jan. 19, 1976, 243757

Int. Cl.² B02C *25/00*

U.S. Cl. 241—30 **8 Claims**



1. A method for maintaining optimum throughput in a grinding circuit including a rod mill to which is fed fresh ore and water and operating in open circuit, and a ball mill operating in a closed circuit with a cluster of hydrocyclone classifiers, both mills discharging into a common pump box wherein the mill discharges are further diluted with water and fed to said hydrocyclone classifiers which serve to classify the mill discharge sending the overflow to further processing and returning the oversize to the ball mill, comprising the steps of:

a. monitoring the cyclone classifier feed density and any one or combinations of the following conditions in the grinding circuit:

1. rod mill sound,

2. ball mill sound,

3. pump box level, and

4. cyclone classifier overflow particle size and density;

b. feeding to a constraint check and decision memory block of a computer the outputs of the cyclone classifier feed

density and of at least one of the following overload constraints from the above corresponding monitors;

1. rod mill overload sound,
2. ball mill overload sound,
3. pump box high level, and
4. cyclone classifier overflow high particle size, and high and low density;

c. feeding to a matrix memory block of the computer the output of the rod mill sound monitor as well as the output of a fresh ore feed rate monitor, said matrix memory block developing rod mill feed rate setpoints as a discontinuous function of both the current rod mill feed rate and the rod mill sound; and

d. controlling the fresh ore feed rate from a cascade control means responsive to the output of the cyclone classifier feed density monitor or from said matrix memory block depending on the operation of the constraint check and decision memory block of the computer which activates either the cascade control means or the matrix memory block depending upon the cyclone classifier feed density and the overload constraints detected.

4,026,480

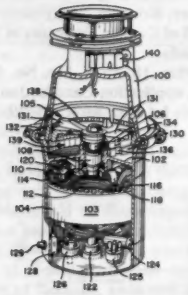
JAM BREAKING METHOD FOR COMMINUTING DEVICE

Theodore F. Meyers, Troy, Ohio, assignor to Hobart Corporation, Troy, Ohio

Division of Ser. No. 461,638, April 17, 1974, Pat. No. 3,970,907. This application June 24, 1976, Ser. No. 699,319

Int. Cl.² B02C *13/30*

U.S. Cl. 241—30 **14 Claims**



1. A method for actuating the jammed cutter wheel of an alternating current motor driven waste disposer comprising;

electrically moving said cutter wheel in alternate forward and backward rotational directions at a rate determined by the frequency of the applied AC power until comminuting and dislodging of said jamming material commences;

urging said cutter wheel to rotate in one rotational direction as said electrically moving, comminuting and dislodging continue;

accelerating said cutter wheel toward the normal rotating speed of said motor upon substantial completion of said comminuting and dislodging.

4,026,481

SONIC COMPRESSING DEVICE UTILIZING MULTIPLE GYRATORILY VIBRATED DRIVE BARS

Albert G. Bodine, 7877 Woodley Ave., Van Nuys, Calif. 91406

Filed Apr. 19, 1976, Ser. No. 678,415

Int. Cl.² B02C *1/06*

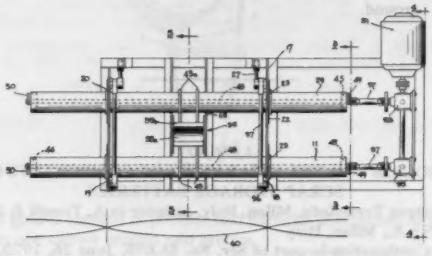
U.S. Cl. 241—266 **6 Claims**

1. A device for compressing material comprising:

a pair of oppositely positioned jaws having a substantial longitudinal extent along which the treated material progresses,

a first set of longitudinal bar members adapted for resonance in a lateral mode of vibration, one of said jaws being attached to said first set of bar members with said bar members being spaced from each other along the longitudinal extent of said first jaw,

a second set of resonant bar members, the other of said jaws being attached to said second set of bar members with said second set of bar members being spaced from each other along the longitudinal extent of said other of said jaws, and



means for providing vibrational energy to said bar members to cause said bar members to resonantly vibrate in a gyratory bending mode with the vibration of the bars of each set being in unison and the vibration of the first set of bars being in opposition to the vibration of said second set of bars, whereby the jaws are vibrationally driven in opposing relationship to compress the material therebetween.

4,026,482

YARN OR THREAD SPOOLING MACHINE

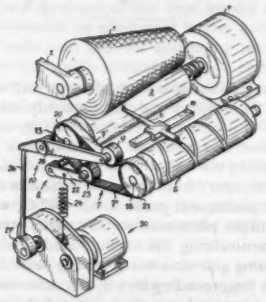
Arthur Rebsamen, Uitikon, Switzerland, assignor to Maschinenfabrik Schweiter AG., Horgen, Switzerland

Filed Sept. 19, 1975, Ser. No. 615,122

Claims priority, application Switzerland, Oct. 8, 1974, 13510/74

Int. Cl.² B65H *54/38*

U.S. Cl. 242—18.1 **3 Claims**



1. Spooling machine having a drive drum (3) to rotate a winding body (1) engageable with the drive drum, to wind thread or yarn in the winding body (1)

drive means in operative driving connection with said drum (3) including a drive pulley (20), a driven pulley (21) and an endless positive drive belt (7) looped between the pulleys

traverse means comprising a traverse control (5) having means (6, 16) guiding the thread or yarn axially across the winding body (1), one (20) of the pulleys (20, 21) being in positive engagement with the drive drum (3) for the winding body and the other (21) of the pulleys (20,

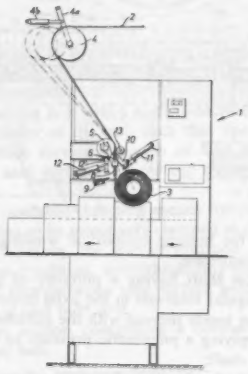
21) being in positive driving engagement with the traverse control drum (5),
power drive means (4) in driving engagement with one of said drums (3, 5)
and means to prevent constant pattern formation on the winding body (1)
wherein, in accordance with the invention
the belt (7) looped about the pulleys (20, 21) has a length in excess of its stretched length to form a driving run (7') of the belt and a return run (7'') of the belt which is loose and has slack;
and said constant pattern formation prevention means further comprises
a biased compensating roller device (8) in engagement with the loose return run (7'') of the belt (7) including a pivotable lever (22), a compensating roller (23) located on the lever and in engagement with the return run (7'') of the drive belt; and a bias spring (24) biasing the lever (22) to move the roller (23) in a position tending to stretch the return run (7'') of the belt (7),
a belt length control roller (9) in engagement with the driving run (7') of the belt (7) ; and cyclically operating means (10; 25, 26, 27) in operative engagement with the control roller (9) and acting on the control roller to cyclically elongate the length of the driving run (7') of the belt (7) and to return the driving run to its stretched length including a control lever (25), the belt length control roller (9) being carried by the lever and in engagement with the driven run (7') of the belt (7), and cam means (26, 27) controlling the position of the control lever.

4,026,483

DEVICE FOR AN APPARATUS FOR COILING OF CABLE, WIRE, WIRE ROPE OR THE LIKE

Oystein Gunnar Skalleberg, Jarfalla, Sweden, assignor to Skaltek AB, Jarfalla, Sweden

Filed Jan. 21, 1975, Ser. No. 542,710
Claims priority, application Sweden, Jan. 25, 1974, 7400981
Int. Cl.² B65H *54/02*
U.S. Cl. 242—25 R 9 Claims



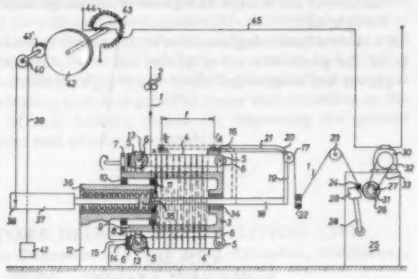
1. An automatic coiling machine for winding a cable onto a take-up drum and for cutting the cable when a coil of predetermined size has been wound thereon comprising in combination: a rotatable take-up drum and means for supporting said drum in a predetermined orientation, means for supporting a cable guiding assembly in parallel relation to said take-up drum; a cable guiding assembly mounted on said support means for swinging thereabout and for axial movement therealong, and means for feeding said cable to said take-up drum; a cutting knife mounted intermediate said guide assembly and drum in proximate relation to said drum; and means for swinging said guiding assembly between a first position in which the cable is moved into contact with said feed means and fed to said take-up drum, an intermediate second position in which the guiding assembly is freely swingable about the shaft and a third position in which the movement of the cable to said feed means is interrupted and said cable is guided into engagement with said knife for cutting thereby.

4,026,484

APPARATUS FOR CONTROLLING A WINDING DEVICE FOR A CONTINUOUSLY SUPPLIED FIBER SLIVER

Werner Naegeli, Winterthur, Switzerland, assignor to Pavena AG, Basel, Switzerland

Continuation of Ser. No. 262,028, June 12, 1972, Pat. No. 3,891,155. This application Feb. 3, 1975, Ser. No. 546,551
Claims priority, application Switzerland, June 19, 1971, 9003/71
The portion of the term of this patent subsequent to June 24, 1992, has been disclaimed.
Int. Cl.² B65H *59/38*
U.S. Cl. 242—45 9 Claims



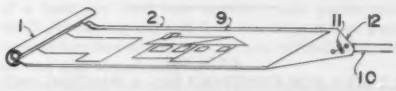
1. Apparatus for controlling the winding of a continuously supplied fiber sliver on a bobbin comprising:
a. a winding device for winding said continuously supplied fiber sliver from a supplying device on the bobbin arranged on said winding device;
b. means for interrupting the winding phase of the winding device by a standstill phase during a bobbin change;
c. a storage drum including guiding means for building-up a fiber sliver reserve, said drum being arranged in the path of said fiber sliver between said supplying device and said winding device for receiving the fiber sliver supplied with a continuous speed to said storage drum, said drum having a surface on which the fiber sliver is helically wound, and means for transporting the helically wound fiber sliver at the surface of the drum in the longitudinal direction of such drum;
d. said guiding means being arranged downstream of said storage drum between the supplying device and the winding device, said guiding means being arranged at least translatorily movably over a distance of the drum surface for building-up the fiber sliver reserve thereon during the standstill phase and for reducing the fiber sliver reserve during the winding phase, said guiding means being operatively connected with means for moving the guiding means to build-up the fiber sliver reserve and for maintaining constant the tension of the fiber sliver during the winding and the standstill phase; and
e. means for electrically controlling a drive motor of the winding device, said means for electrically controlling the drive motor being connected with said guiding means and said winding device, said means for electrically controlling the drive motor being arranged to be operated by movement of said guiding means.

4,026,485

PLANS CARRIER

Arnold A. Ambrose, 255-A Alamaha St., Kahului, Hawaii 96732

Filed July 26, 1976, Ser. No. 708,697
Int. Cl.² B65H 75/00
U.S. Cl. 242—55 2 Claims



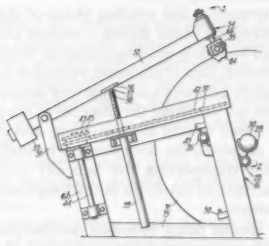
1. A plans carrier comprising:
a. a long rigid trough member having a C-shaped cross section, and thus two longitudinal edges said trough like member having a length greater than the width of the plan to be carried;
b. a flexible cover sheet having a width approximately equal to the length of the trough member and a length greater than the usual plan to be carried;
c. a first fastening means operably securing one end of the flexible cover to the trough member along the inside surface of the trough along one longitudinal edge of the trough; and
d. a second fasteneing means operably securing the free end of the protective cover to the roll when the protective cover has been rolled about the trough member.

4,026,486

PAPER REEL STANDS

Arthur Duerden Law, 60 Thomas St., East Brighton, Victoria, Australia (3187)

Filed July 27, 1976, Ser. No. 709,177
Int. Cl.² B65H 19/30
U.S. Cl. 242—58.6 11 Claims



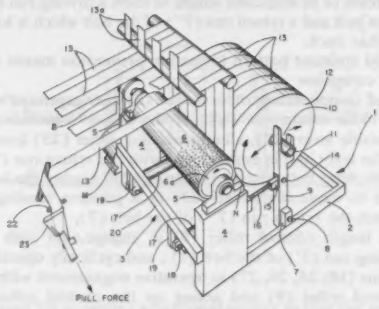
1. A paper reel stand, for supplying a web of paper to a paper processing machine, including a frame having at each side thereof a lifting jack, a common power source to operate each lifting jack and each jack arranged to engage a shaft adapted to rotatably support a paper roll to raise the latter to a paper feeding position on the stand, a counter poise frame pivotally mounted on the stand and with the free end of said latter frame movable to and remote from an operating position adjacent the perimeter of the paper roll, said frame having at the free end thereof adjustable means for engaging the paper roll to control feed alignment and tension imparted to the web being fed from the roll and to prevent over-run of the roll when take-off of the web from the roll stops or slows down.

4,026,487

DRUM UNWIND SYSTEM FOR SHEET MATERIALS

Thomas M. Ales, Jr., Neenah, Wis., assignor to Kimberly-Clark Corporation, Neenah, Wis.

Filed Dec. 8, 1975, Ser. No. 638,332
Int. Cl.² B65H 17/08
U.S. Cl. 242—65 8 Claims



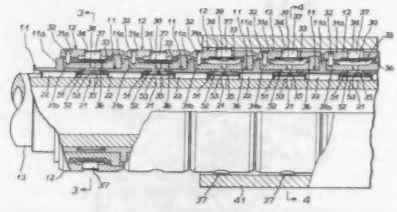
1. In a drum unwind system in which a roll of sheet material is unwound by withdrawing sheet material from the roll circumference at a pressure nip formed between the roll and an unwind drum which drives the roll in rotation, a covering for the unwind drum which is continuous and deformable more easily in the pressure nip than the roll of material such that the roll of material is not deformed radially in the pressure nip.

4,026,488

APPARATUS FOR HOLDING CYLINDRICAL WINDING CORES

Kenzo Hashimoto, Kyoto, Japan, assignor to Nishimura Seisakusho Co., Ltd., Kyoto, Japan

Filed July 13, 1976, Ser. No. 704,840
Int. Cl.² B65H 75/18
U.S. Cl. 242—72 B 5 Claims



1. Apparatus for holding cylindrical winding cores on a winding shaft comprising:
a driven hollow shaft having a plurality of apertures arranged at regular intervals in the axial direction to communicate the inside thereof with the outside thereof;
means for supplying a pneumatic pressure to the inside of said hollow shaft;
an arrangement of a plurality of friction collars and a plurality a core holder assemblies alternatively arranged on said hollow shaft;
each of said friction collars being axially slidable along said hollow shaft but so constrained as to rotate together with said hollow shaft;
each of said core holder assemblies comprising:
an annular body frictionally supported between each adjoining two of said friction collars, said annular body defining a pressure chamber therein and having at least one window opening communicating said pressure chamber with the outside of said annular body and at least one

other opening communicating said pressure chamber with the inside of said hollow shaft through said aperture for introduction of said pneumatic pressure to said pressure chamber,

expansible means disposed in said pressure chamber, said expansible means being radially expansible in response to said pneumatic pressure introduced to said pressure chamber, and

friction catch means attached to said expansible means, said friction catch means being movable together with said expansible means along and through said opening in said outer peripheral wall of said annular body between a first position at which the free end of said catch means is projected from said opening in said outer peripheral wall and is engageable with the inside wall surface of a cylindrical core when placed about said annular body and a retracted position at which said catch means is apart from said inside wall surface of said core; and

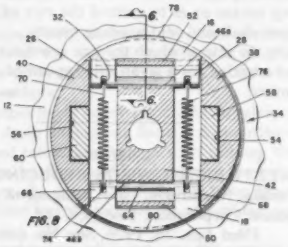
means for holding said arrangement of said plurality of friction collars and said plurality of core holder assemblies on said hollow shaft under pressure in the direction of the axis of said hollow shaft.

4,026,489

QUICK THREADING MAGNETIC TAPE REEL

Larry D. James, 9192 Ellsworth, Huntington Beach, Calif. 92646

Filed May 21, 1976, Ser. No. 688,539
Int. Cl.² B65H *75/28*
U.S. Cl. 242—74.2 **20 Claims**



1. In a tape reel of the kind having a generally cylindrical winding hub and guide flanges fixed to its ends, the improvement which comprises:

formation of the hub with a surface section separable from the remainder of the hub such that upon separation of such surface section a length of tape may be inserted between said surface section and the remainder of the hub;

selectively operable clamping means for causing said surface section to be selectively clamped to the remainder of the hub whereby the hub is returned to substantially cylindrical condition, notwithstanding the presence of a length of tape between said surface section and the remainder of said hub; and

said surface section comprising a cordial section of the cylindrical hub.

4,026,490

SPICE MILL

Karl Figge Johansson, 7 Beckbrannarbacken, Stockholm, Sweden (S-116 35)

Filed Mar. 1, 1976, Ser. No. 662,633
Int. Cl.² A47J *42/04*
U.S. Cl. 241—169.1 **5 Claims**

1. A spice mill comprising a grinding assembly adapted to be removably attached to the open mouth of a spice jar, said grinding assembly comprising a grinding rotor adapted to be located within the mouth of said jar, said rotor having helical teeth at the outer circumference thereof, housing means, said grinding rotor being rigidly secured to said housing means, a second grinding member comprising an annulus the exterior of which is adapted to frictionally engage the inner surface of the mouth of said spice jar to fix said annulus against rotation relative to said jar, said annulus being disposed in surrounding spaced relation to said grinding rotor, tooth means formed on the inside of said annulus for defining together with said grinding rotor teeth a grinding space between said rotor and said annulus, an end plate mounted on said rotor at the end of said

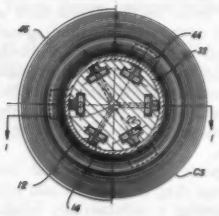
grinding space which faces the interior of said jar, said end plate providing an axial abutment for said grinding rotor and being formed with recesses at the periphery thereof to admit only separate grains of spice at a time to said grinding space when the jar with said grinding assembly mounted therein is so positioned that the mouth of said jar faces downwardly, said housing means affording a hand grip for rotating said grinding rotor, and said housing means including longitudinal passages communicating with said grinding space and extending to the exterior of said housing means for dispensing the ground spices from said grinding assembly.

4,026,491

WINDER DRUMS FOR STRIP SLITTING LINES

Theodore Bostroem, 470 Park Road Extension, Middlebury, Conn. 06762

Filed Dec. 31, 1975, Ser. No. 645,652
Int. Cl.² B65H *75/24*
U.S. Cl. 242—72 B **23 Claims**



1. Apparatus for winding a plurality of metal strips on a drum to form a plurality of coiled strips, comprising:

a. a substantially solid, non-collapsible drum formed with a plurality of longitudinally extending, circumferentially spaced slots in the periphery thereof;

b. rail members and interconnected wear members mounted in each of said slots, and means for biasing said rail and wear members radially inwardly to a position wherein the outer surface of each wear member is below the periphery of said drum;

c. core means positioned loosely around the periphery of said drum for receiving individual strips, and spacer means between said core means, said core means being rotatable on said drum;

d. an expansible, fluid-receiving means positioned in each slot radially inwardly of said rail, and

e. a fluid control system operatively connected to each of

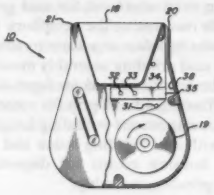
said fluid-receiving means for supplying fluid under pressure thereto, the fluid pressurization of said fluid-receiving means functioning to expand the same and force said rail and wear members radially outwardly into frictional contact with said core means thereby creating frictional torque, enabling to produce tension in said metal strips and consequent controlled tight winding of said strips on said core means, partial reduction of said fluid pressure permitting the tightly wound coiled strips on their respective cores to slip on said drum surface and the loosely wound coiled strips to continue rotation so as to remove the slack from such strips, whereby substantially uniformly tight wound coiled strips are formed.

4,026,492

RIBBON TENSION CONTROL MEANS

Jack L. Kern, Arlington, Tex., assignor to Xerox Corporation, Stamford, Conn.

Filed Sept. 29, 1975, Ser. No. 617,559
Int. Cl.² B65H *23/10*
U.S. Cl. 242—75.2 **6 Claims**



1. In a ribbon cartridge having a top cover section, a bottom cover section, a sidewall connecting section, a ribbon supply means, a ribbon take-up means and means for transferring a ribbon between said supply means and said take-up means; the improved ribbon tension control means comprising:

a resilient one-piece frictional drag means positioned at a location along the path of travel of the ribbon after the ribbon departs from the ribbon supply means, said drag means including a first end portion stationarily mounted to the bottom cover section and a second end portion whose cross sectional end area abuts against the side surface of the ribbon, said drag means being formed of a material with a substantially constant coefficient of friction and being resiliently responsive to variations in ribbon tension resulting from operation of said ribbon take-up means so as to yieldably bias the ribbon in a direction opposite to the movement of the ribbon past the drag means,

ribbon guide means positioned between said one-piece frictional drag means and said ribbon supply means for maintaining a substantially constant angle of contact between the one-piece frictional drag means and the ribbon.

4,026,493

HYDRAULIC DRIVE FOR FISHING REEL HAVING VARIABLE TAKEUP RATIO

William C. Anderson, 204 Forest Ave., Anderson, S.C. 29621

Filed July 16, 1976, Ser. No. 705,786
Int. Cl.² A01K *89/02, 89/01*
U.S. Cl. 242—84.1 R **14 Claims**

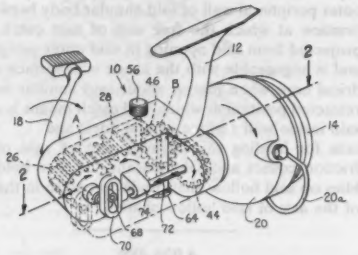
13. In a fishing reel having a frame for attachment to an associated fishing rod, a spool filled with fishing line carried on said frame, handle means rotatably carried by said frame, winding means carried by said frame for causing said fishing line to wind upon said spool when actuated, drive means connected between said handle means and said winding means for driving said winding means, said drive means comprising:

a. a first hydraulic pump means carried by said frame having a drive pump member connected to said handle means;

b. a second hydrauiic pump means carried by said frame having a driven pump member;

c. connecting means connecting said driven pump member and said winding means causing said winding means to be driven as said driven pump member is actuated;

d. conduit means connecting said first and said second pump means to define a closed hydraulic circuit together with said pump means having a fluid contained therein;



e. said drive pump member actuated by rotation of said handle means to force said fluid through said conduit means to said second pump means for actuating said driven pump member and winding means so as to cause said line to wind upon said spool;

f. flow control means connected in said conduit means for controlling the flow of said fluid delivered to said second pump means so as to control the rate of rotation of said output shaft and said winding means;

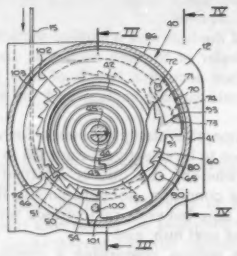
whereby the rate at which the line is wound upon said spool can be varied for a given drive speed of said drive pump member.

4,026,494

SAFETY BELT TENSION REDUCING MEANS

Akira Tanaka, Northridge, Calif., assignor to American Safety Equipment Corporation, Encino, Calif.

Filed Apr. 26, 1976, Ser. No. 680,111
Int. Cl.² A62B *35/02;* **B65H** *75/48*
U.S. Cl. 242—107 **10 Claims**



1. In a safety belt retractor having a belt storage reel biased toward a belt wound condition, an emergency locking means for preventing a further unwinding movement of said belt when it is unwound to a position of use and an emergency condition exists and a separately acting belt tension reducing means for reducing the tension on said belt when in use due to the rewinding bias of said reel, the improvement in said belt tension reducing means comprising the provision of:

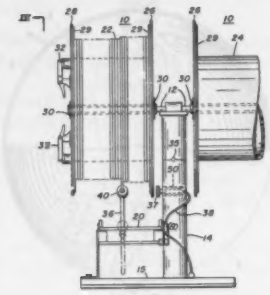
counter biasing means for biasing said reel in a belt unwinding direction when connected thereto; and

means for releasably connecting said counter biasing means to said reel.

4,026,495
ROTATING TUBING PAYOFF SYSTEM

Alan R. Bartelt, West Lafayette, Ind., assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed Feb. 2, 1976, Ser. No. 654,354
Int. Cl.² B65H 49/00
U.S. Cl. 242—129.62 3 Claims



1. An arrangement for paying off thin walled tubing in a rotating manner from relatively large, heavy coiled supplies of the tubing, the arrangement comprising:

a structural base member disposed in a substantially horizontal manner;

a plurality of vertical members having their lower ends rigidly fixed to said base member at spaced apart locations therealong;

cross members;

means for respectively mounting the cross members on the upper ends of the vertical members in a manner that permits the cross members to rotate about the axes of the vertical members;

drums for respectively receiving coiled supplies of tubing, with each drum having one fixed and one removable rim thereon and releasable fasteners for holding the removable rim on the drum and firmly against the coiled supply on the drum, the drum being adapted to be mounted on a cross member to rotate about the axis of the cross member;

a channel member extending between the vertical members and adapted to guide tubing as it is pulled from the drums to a work area; and

brake means adapted to engage each drum on its cross member when tension on the tubing being pulled from the drum is removed, and to disengage the drum when tension on the tubing occurs.

4,026,496
AUTOMATIC REPEAT SYSTEM FOR MAGNETIC TAPE RECORDERS AND REPRODUCERS

Makoto Kaneda, Sakado, Japan, assignor to Tokyo Denshi Kabushiki Kaisha, Sakado, Japan

Filed July 23, 1975, Ser. No. 598,380
Claims priority, application Japan, Aug. 19, 1974, 49-94286; Aug. 19, 1974, 49-94287
Int. Cl.² G11B 15/44
U.S. Cl. 242—191 7 Claims

1. An automatic repeat system for magnetic tape recorders and reproducers, comprising:

a reproducing member for controlling a reproducing operation;

a rewinding member for controlling a rewinding operation;

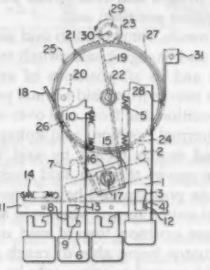
a selection member mounted for pivotal movement about an axis of rotation and engageable with said reproducing and rewinding members;

a first toothed driving wheel;

a second toothed driven wheel having first and second notches in the toothed portion thereof and mounted such that the toothed portion thereof engages said first toothed driving wheel and is driven thereby, said first and second wheels being disengaged when one of said first and second notches lies adjacent first toothed wheel;

first and second arms mounted on said selection member for rotation therewith;

a further member mounted on said second toothed wheel and located between said first and second arms, said first and second arms alternately engaging said further member to urge said further member and said second toothed wheel into rotational movement to engage the teeth of said second wheel with the teeth of said first wheel;



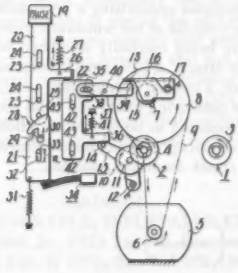
means for moving said reproducing member from a first to a second position upon termination of a reproducing operation such that said reproducing member rotates said selection member in a first direction and said first arm engages said further member to rotate said second toothed wheel into operative engagement with said first toothed wheel; and

means for moving said rewinding member from a first to a second position upon termination of a rewinding operation such that said rewinding member rotates said selection member in a second direction and said second arm engages said further member to rotate said second toothed wheel into operative engagement with said first toothed wheel.

4,026,497
PAUSE DEVICE FOR TAPE RECORDER

Noriyuki Yamashita, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 503,099, Sept. 4, 1974, abandoned. This application Dec. 23, 1975, Ser. No. 643,809
Claims priority, application Japan, Sept. 17, 1973, 48-108598
Int. Cl.² G03B 1/04; G11B 15/32
U.S. Cl. 242—206 8 Claims



1. In a tape recorder comprising a motor, a capstan driven by said motor, a pinch roller, and resilient means pressing said pinch roller toward said capstan to grip tape between said pinch roller and said capstan and drive said tape in response to rotation of said capstan, the invention comprising:

A. switch means connected to said motor to control the supply of power to said motor; and

B. pause means for stopping the movement of said tape by separating said pinch roller from said capstan when said tape is moving, said pause means comprising:

1. an actuator movable between a normal position and an over-stroke position and having a pause position between said normal position and said over-stroke position,

2. separator means connected to said actuator and to said pinch roller to separate said pinch roller from said capstan when said actuator moves from said normal position toward said over-stroke position but not as far as said pause position; and

3. linkage means connected to said actuator to be moved thereby and engaging said switch means in said normal position and in all positions of said actuator as said actuator moves from said normal position to said over-stroke position and from said over-stroke position back to said normal position, said linkage being disengaged from said switch means by said actuator when said actuator moves through said over-stroke position to said pause position and being returned to engagement with said switch means when said actuator moves from said pause position toward said over-stroke position, said actuator being able to reach said pause position from said normal position only by first moving to said over-stroke position and being able to return from said pause position to said normal position only by first moving back to said over-stroke position.

4,026,498

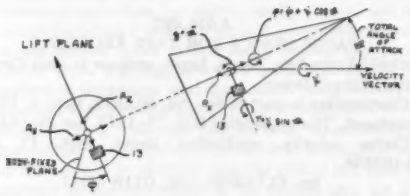
MOTION SENSOR FOR SPINNING VEHICLES

Daniel H. Platus, Los Angeles, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Aug. 5, 1975, Ser. No. 602,040

Int. Cl.² F42B *15/14, 13/30, 15/10;* **F41G** *9/00*

U.S. Cl. 244—3.23 **2 Claims**



1. A motion sensor system for measuring the flight motion parameters of a spinning vehicle with respect to the Euler angle of coordinates comprising a pendulum that rotates with respect to the vehicles at the windward rotation meridian rate, said pendulum being inertially stabilized with respect to the total angle of attack, a yaw angular rate sensor mounted to said pendulum, a normal acceleration sensor mounted to said pendulum for measuring pitch, and axial acceleration and roll rate sensors mounted in body fixed relationship to said vehicle, said rate sensors producing measurements for determining the angle of attack from the relation

$$\theta = \tan^{-1}\left(\frac{r}{p-\dot{\phi}}\right)$$

where

θ = angle of attack

r = yaw rate

p = roll rate

ϕ = windward meridian rotation rate.

4,026,499

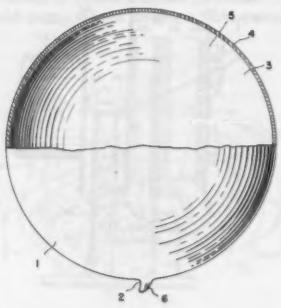
GLASS BALLOONS AND METHOD FOR MAKING SAME

David Rogers Crosby, 26 Colonial Ave., Haddonfield, N.J. 08033

Filed Mar. 15, 1976, Ser. No. 667,015

Int. Cl.² B64B *1/62;* **C03B** *9/00;* **A63H** *27/10*

U.S. Cl. 244—31 **9 Claims**



1. An approximately spherical envelope of glass, containing a lighter-than-air gas, the combined weight of the glass and of the contained gas being less than the weight of the displaced air; a gas-tight seal integral with the envelope, the mass of the gas within the envelope so choosen that the principal stress in the envelope is tension due to the internal gas pressure said pressure having a slightly positive pressure in relation to ambient.

4,026,500

AIRCRAFT WING WITH INTERNAL FLOW CONTROL PROPULSION

Harlow B. Grow, Pacific Palisades, Calif., assignor to Mark S. Grow, El Cajon; Bonnie B. Madden, Palo Alto and Michael J. Grow, El Cajon, all of, Calif., part interest to each

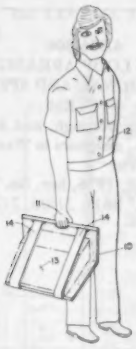
Filed June 5, 1975, Ser. No. 583,978

Int. Cl.² B64C *3/02;* **B64D** *27/18*

U.S. Cl. 244—36 **10 Claims**

1. A jet thrust aircraft wing comprised of upper and lower air foils and each of said air foils having upper and lower external surfaces extending between spaced leading and trailing edges and extending coextensively with the wing span, a propulsion air duct between and formed by the lower external surface of the upper air foil and the upper external surface of the lower air foil to extend between intake and exhaust slots coextensive with said leading and trailing edges and continuous without interruption between the wing tips, a jet thrust engine disposed within the propulsion air duct of the wing, laterally convergent intake plenum walls in open communication between said intake slot and the engine, and laterally divergent exhaust plenum walls in open communication between the engine and said exhaust slot, whereby propulsion air separates air flow over and under the upper and lower air foils coextensively of the wing span.

4,026,501
CARRIER
Edward J. Schultz, San Diego, Calif., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest
Filed Dec. 29, 1975, Ser. No. 644,622
Int. Cl.² B65D 71/00
U.S. Cl. 224—45 R 2 Claims



1. A carrier adaptable for transporting a typewriter in its normal position of use,

said carrier formed of a flat sheet of material bent as an L-shape, in section, to form a flat base plate extending generally perpendicularly to a flat handle plate, said base plate of a size to extend under and beyond the periphery of a typewriter, the bottom of which rests on said base plate, with said handle plate of a size to extend upwardly behind and beyond the periphery of the rear side of a typewriter resting on said base plate,

with a plurality of uniform size holes formed in said base plate and located to each individually engage of leg of a typewriter resting on said base plate, and with a hole formed in the handle section to serve as a hand grip means,

a pair of flexible straps, each fixed about the upper edge of the handle plate and of a length to extend about and engage the top of a typewriter resting on said base plate, the legs of which typewriter are engaged in said holes in the base plate, so that an end of each of said straps may be bent over an edge of the base plate to detachably fasten to the underside of the base plate, together with

detachable mating fastening means fixed to the end of each of said straps and the underside of said base plate.

4,026,502
SKI DEVICES FOR MOUNTING ON LANDING GEAR HAVING WHEELS DISPOSED IN TANDEM
Jean Mascle, Paris, France, assignor to Messier Hispano, Montrough, France
Filed Jan. 22, 1976, Ser. No. 651,545
Claims priority, application France, Jan. 28, 1975, 75.02490
Int. Cl.² B64C 25/52
U.S. Cl. 244—108 9 Claims

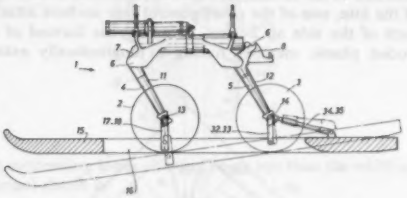
1. A ski device adapted to be mounted on a landing gear provided with front and rear struts each arranged to carry a wheel, the wheels being positioned in tandem, comprising

a monobloc ski assembly having an aperture therethrough through which the wheels pass,

a first mechanical connection including elastic means having one end articulated to the ski and the other end articulated to the front strut,

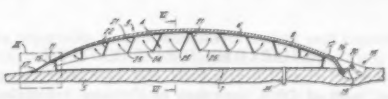
a second mechanical connection including a rigid member and an hydraulic jack means, said rigid member having one end articulated to the ski and the other end articulated to the rear strut, said hydraulic jack having one end articulated to said rigid connecting member and its other end articulated to the ski,

said elastic means being adapted for withstanding lateral loadings exerted on the ski and to transmit them to said front strut and being adapted for axial extension when subjected to a traction loading and when at rest resuming



their initial length allowing for the transmission of vertical stresses; said rigid connecting member and said hydraulic jack means forming a triangulated mechanical connection, said jack means being effective to take up the longitudinal stresses and to position the ski in its lowered and raised position with respect to the wheels and to maintaining it in all of the aforesaid positions.

4,026,503
FUEL STORAGE MEANS
Arthur Neville Rhodes, Warton Aerodrome, near Preston, England, assignor to British Aircraft Corporation Limited, London, England
Filed Dec. 18, 1975, Ser. No. 641,886
Claims priority, application United Kingdom, Dec. 19, 1974, 55073/74
Int. Cl.² B64D 37/06
U.S. Cl. 244—135 B 10 Claims

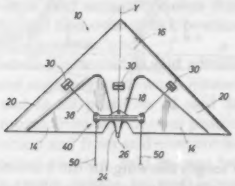


1. An aircraft having a surface region, a fuel storage means expandable to a position in which it is at least partially external to the surface region, the fuel storage means including a deformable exterior wall panel in the form of a leaf spring member having two opposite end regions with an intermediate region between, anchorage means for anchoring only the two opposite end regions of said panel to spaced regions of the aircraft surface region, the said intermediate region being free of such anchorage means, translatory means included in at least that anchorage means at one of the said end regions to allow that end region to move toward said other end region when the intermediate region between said end regions of the wall panel is bowed outwards from a position close to the surface region to lie proud of said surface region, the said wall panel being inherently biased toward that position in which its intermediate region lies close to the said surface region.

4,026,504
MANEUVERABLE, INFLATABLE KITE
Julius M. Christoffel, Jr., 5323 Yarwell, Houston, Tex. 77035
Filed Feb. 9, 1976, Ser. No. 656,156
Int. Cl.² B64C 31/06
U.S. Cl. 244—155 A 6 Claims

1. A maneuverable, inflatable kite, said kite having a single air chamber which, when inflated, is generally in the form of a deltoid having a bulbous nose portion, a central air beam and two diverging side air beams, the kite also having two

uninflatable areas forming a pair of gull-wing airfoils, one of said airfoils extending between the central air beam and each of the side air beams; three control line anchors, each anchor formed of an elongated arm portion adhesively attached to the kite and a leg portion extending therefrom, the leg portion having at least one aperture, one of said control line anchors attached to the central air beam approximate the flying point of the kite, one of the other control line anchors attached to each of the side air beams, a control bar formed of an extruded plastic member having a longitudinally extending,



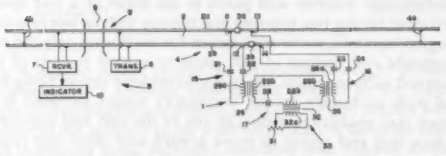
ribbed cross section with flattened end portions, each flattened end portion having two apertures, one of said apertures being a control line aperture, the other of said apertures being a maneuvering line aperture, a third control line aperture in the ribbed cross section midway of the control line apertures in the flattened end portions, at least one control line extending from the control line anchors to the control line apertures in the control bar, and a maneuvering line attached to each maneuvering line aperture of the control bar whereby a parallel pair of maneuvering lines extend to a flyer.

4,026,505

VARIABLE HIGH PASS COUPLER

Willard L. Geiger, Chagrin Falls, and John D. Williams, Burton, both of Ohio, assignors to Harmon Industries, Inc., Grain Valley, Mo.

Filed Jan. 15, 1976, Ser. No. 649,502
Int. Cl.² B61L *21/06*
U.S. Cl. 246—34 R **20 Claims**



1. A bypass circuit for coupling AC signals around a set of insulated joints in a railroad track, comprising

a high pass coupler provided with input and output coupling means for connecting the coupler to a track at opposite sides of insulated joints therein,

means in said coupler between said input and output coupling means for resonating with the rack inductance to establish a resonant frequency for the coupler,

such track inductance as seen by the coupler decreasing in magnitude in response to the moving shunt affect of a train approaching said coupling means and thus increasing such resonant frequency,

said means for resonating being of a magnitude to assure that upon occurrence of such an approaching train such resonant frequency remains below the frequency of the AC signals to be coupled thereby, and

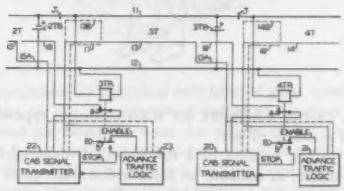
means for effecting losses in the coupler such that the coupler and the track to which the coupler is connected present to the AC signals coupled around the insulated joints and to the electrical equipment operating on those AC signals an impedance characteristic substantially as though the track were electrically continuous.

4,026,506

TRANSMITTING LOOP ARRANGEMENT FOR RAILROAD CAB SIGNAL AND SPEED CONTROL SYSTEM

Thomas J. Bourke, Plum Borough, and Kenneth J. Buzzard, Pittsburgh, both of Pa., assignors to Westinghouse Air Brake Company, Swissvale, Pa.

Filed Aug. 31, 1976, Ser. No. 719,336
Int. Cl.² B61L *21/06, 21/08*
U.S. Cl. 246—34 R **15 Claims**



1. A loop arrangement for transmitting cab signal controls to a vehicle, provided with cab signal apparatus, traversing a stretch of fixed roadway divided into a plurality of sections, comprising in each section the combination of,

a. first transmitting loop extending parallel to and within the section roadway generally along a first predetermined alignment but with an offset portion of preselected length at the section exit end positioned on a second predetermined alignment,

b. a second loop of the same preselected length as said offset portion of said first loop positioned at the exit end parallel to and within the section roadway along said first predetermined alignment,

c. a cab signal transmitter means at the exit end coupled to said first loop and responsive to advance traffic conditions along said stretch for transmitting into said first loop a selected one of a plurality of cab signal commands in accordance with the location of the next preceding vehicle,

d. said cab signal transmitter means also coupled to said second loop for transmitting the same commands but responsive to the occupancy condition of the adjoining advance section for interrupting the transmission of cab signal commands when said adjoining advance section is occupied by a vehicle,

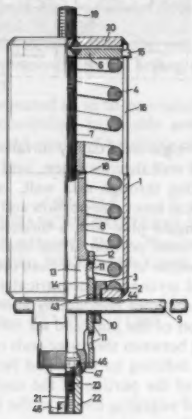
e. a first cab signal pick-up means on each vehicle traversing the stretch positioned to respond to a loop signal in each loop positioned along said first predetermined alignment and coupled for actuating the associated cab signal apparatus to a movement control condition when a signal is present and to a cut-off condition when a signal is absent in such loop, and

f. a second cab signal pick-up means on each vehicle positioned to respond to a signal in said offset portion of said first loop and coupled for resetting said associated cab signal apparatus from said cut-off condition to an active condition only when a proceed cab signal command is received from that loop.

4,026,507
APPARATUS FOR SUPPORTING PIPE LINES OR THE LIKE

Karl-Heinz Thiedemann, An der Stipskuhle 42, 46 Dortmund, Germany

Filed Oct. 17, 1975, Ser. No. 623,546
Claims priority, application Germany, Oct. 21, 1974, 2449944
Int. Cl.² F16L 3/00
U.S. Cl. 248—54 R 12 Claims



1. An apparatus for supporting pipe lines or the like on a supporting structure, the apparatus comprising:

a. a housing for connection with the supporting structure, said housing having a longitudinal axis and an end portion;

b. biasing means with opposite ends, one end of said biasing means being so disposed in said housing as to act against said housing end portion;

c. a spring rest in said housing, said spring rest being coupled with the other end of said biasing means;

d. a support element coupled with said spring rest;

e. means, coupled between said support element and spring rest, for longitudinally adjusting said support element relative to said spring rest in response to rotation of said support element;

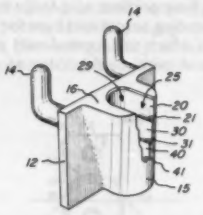
f. means, selectively connectable with said support element, for blocking movement of said spring rest relative to said housing in either longitudinal direction without blocking adjusting movement of said spring rest in response to rotation of said support element.

4,026,508
HANGER BRACKET

Robert D. Ziegler, Excelsior, Minn., assignor to Litton Business Systems, Inc., Beverly Hills, Calif.

Filed June 21, 1976, Ser. No. 698,413
Int. Cl.² A47F 5/00; E06B 7/28
U.S. Cl. 248—220.3 5 Claims

1. In a bracket for attaching a hanger member of the type including a vertical leg portion and a horizontal arm portion to a perforated board display stand, the improvement wherein said bracket includes first hanger-receiving recess means for engaging a vertical hanger leg portion, said first recess means including a plurality of vertically adjacent channels, the width of each succeeding lower channel being less than the width of the channel above it; and second hanger receiving recess means communicating with said first recess means for engaging a horizontal hanger arm portion, said second recess means including a plurality of vertically adjacent channels, the width

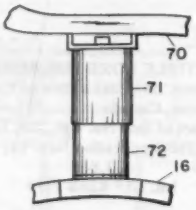


of each succeeding lower channel being less than the width of the channel above it.

4,026,509
ADJUSTABLE STANDARD FOR SWIVEL CHAIR

Richard H. Wolters, Grand Rapids, Mich., assignor to Herman Miller, Inc., Zeeland, Mich.

Continuation of Ser. No. 648,795, Jan. 13, 1976, abandoned. This application Aug. 16, 1976, Ser. No. 714,799
Int. Cl.² F16M 11/00, 13/00
U.S. Cl. 248—406 8 Claims



1. An adjustable support spindle for a chair seat capable of both rotation and vertical adjustment, a base supporting said spindle, said spindle having a threaded shaft and a tubular post telescopically receiving said shaft, said post rotationally and slidably mounted through said base, cap means secured to the upper end of said post and threadedly engaging said shaft; clutch means having one element securing said clutch means to said shaft for rotation therewith and a releasable detent member engaging said cap means; a lock member at the lower end of said post and a downwardly opening pocket in said base for receiving said lock member and holding said post against rotation when said lock means is seated therein; a spring normally urging said post upwardly and said lock means into said pocket whereby said spindle can turn with respect to said cap upon release of said detent means effecting vertical adjustment of said spindle; said spring having a predetermined compression value less than the weight of an occupant of the chair seat whereby when the chair seat is occupied said post shifts downwardly and said lock member disengages said pocket to free said post and cap to rotate with said spindle.

4,026,510
WALL HANGER

Warren B. Holmes, 307 E. Florida Ave., Hemit, Calif. 92343

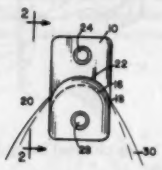
Filed May 17, 1976, Ser. No. 687,169
Int. Cl.² A47G 1/16; A47F 7/14
U.S. Cl. 248—493 1 Claim

1. A hanger for supporting articles on a vertical flat surface, said hanger including:

a substantially elongated base portion having at least one flat side for placing against said vertical flat surface, said base including a first opening therethrough to accommo-

date a fastener to secure said base portion to said vertical flat surface;

an outwardly protruding smoothly contoured ledge extending from said base portion, said ledge having a radius of curvature extending across said base for holding a hanger member upon which are located said articles, a second opening formed within said ledge to accommodate a



fastener to secure said hanger to said vertical flat surface, a line interconnecting the centers of said openings passing through said ledge and divides said ledge into two equal parts; and

an upwardly extending lip attached to said ledge and spaced from said base to connect said hanger member to said ledge.

4,026,511

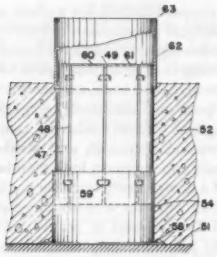
DESTRUCTIBLE BORE FORMING MEANS

Erhard Armin Diener, 643 Saskatchewan Crescent E., Saskatoon, Saskatchewan, Canada

Continuation-in-part of Ser. No. 440,589, Feb. 7, 1974, Pat. No. 3,921,953. This application Nov. 14, 1975, Ser. No. 631,880

Int. Cl.² B28B *7/34*

U.S. Cl. 249—62 **8 Claims**



1. A bore forming device for concrete floors and the like which are poured upon a supporting surface, comprising in a combination a base portion supportable by the associated supporting surface, a core of semi-rigid material supported by said base portion, ignitor means operatively connected with said core which, when ignited, partially melts and chars said core, and shroud means engaged with the upper end portion of said core, said core including a plurality of vertically situated grooves formed in the wall surface of said core and a plurality of radically extending grooves formed in the upper surface of said core and extending from the upper ends of said vertically situated grooves, said ignitor means comprising an ignitor harness including a plurality of vertically situated cords frictionally engageable within said vertically situated grooves and a plurality of radially extending cords extending inwardly from the upper ends of said vertically situated cords and frictionally engaging within said radially extending grooves, and a common ignitor portion connected to the inner ends of said radially extending cords.

4,026,512

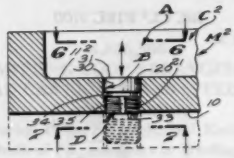
STATIC MOLD VENT

Kenneth Holt, 9700 Norlain, Downey, Calif. 90240

Filed July 28, 1975, Ser. No. 599,699

Int. Cl.² B29C *1/14;* **F15D** *1/00;* **B65D** *51/16*

U.S. Cl. 249—141 **9 Claims**



1. A mold having a mold cavity surface and an outer surface defining a mold wall therebetween, said mold wall having an opening extending through said wall, said opening having a straignt cylindrical inner end portion and a threaded outer end portion, an elongate plug with a threaded outer end portion engaged in the outer portion of the opening and a cylindrical inner portion smaller in diameter than the inner end portion of the opening and arranged concentrically therein and defining an inwardly opening air conducting annulus coextensive with the inner portion of the plug and air bleed means in the plug communicating between the outer ends of the annulus and the plug, said plug defining an inner end face in plane alignment with the plane of the portion of the cavity surface about the annulus and tool engaging means at the outer end of the plug.

4,026,513

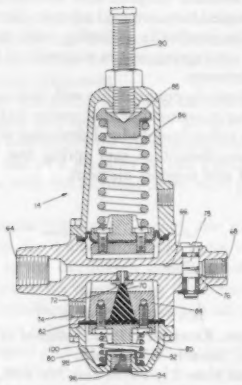
PILOT VALVE

Russell J. Callenberg, Benicia, Calif., assignor to Grove Valve and Regulator Company, Oakland, Calif.

Filed Nov. 6, 1975, Ser. No. 629,213

Int. Cl.² G05D *16/16*

U.S. Cl. 251—61.1 **3 Claims**



1. In a pressure control valve including:

a housing;

a pressure responsive member sealed across said housing to form a sensing chamber therein;

said member being movable in response to forces asserted against it;

a valve passageway in said housing;

a valve port in said passageway;

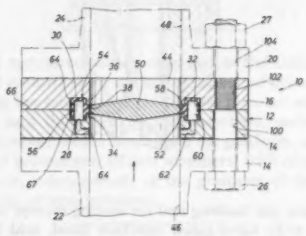
a complementary valve member carried by said pressure responsive member;
fluid pressure in said chamber acting on one side of said pressure responsive member;
means for applying a predetermined force against the other side of said pressure-responsive member;
a sensing port opening into said chamber to introduce fluid being pressure-controlled;
the improvement comprising;
a disc in said chamber covering said sensing port;
a small orifice in said disc to restrict flow into and out of said chamber; and
spring means biasing between said disc and said one side of the pressure responsive member urging said disc against said sensing port;
said spring being selected so as to be overcome by the fluid being pressure-controlled to enable entry thereof into said chamber in the event of blockage of said orifice.

4,026,514

PRESSURE ENHANCED BUTTERFLY VALVE

Joe D. Sumner, 6903 Alderney Drive, Houston, Tex. 77055, and Carlton H. Stanley, 2002 Cobble Creek Drive, Houston, Tex. 77090

Filed Mar. 8, 1976, Ser. No. 664,527
Int. Cl.² F16K *51/00*
U.S. Cl. 251—152 **19 Claims**



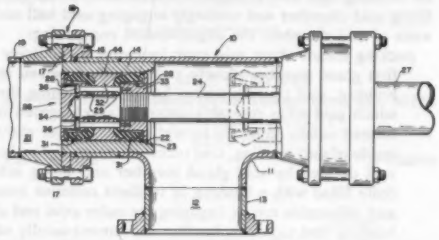
1. A high pressure butterfly valve having pressure enhanced sealing, said butterfly valve comprising:
a valve body being connectable to a flow line and being formed to define a flow passage;
said valve body defining an annular seal chamber having an annular seal aperture of smaller dimension than the dimension of said seal chamber;
valve stem means being rotatably supported by said valve body and having a valve operating portion thereof extending externally of said valve body, said valve stem means having a butterfly disc engaging portion disposed within said flow passage;
a butterfly element being positioned within said flow passage and being supported for rotation between open and closed positions by said valve stem means, said butterfly element having an outer periphery that is positioned in juxtaposed relation with said annular seal aperture in the closed position of said butterfly element;
an annular sealing element being located within said seal chamber and being formed to define an annular pressure receiving base portion and a seal portion, said seal portion extending through said annular seal aperture into said flow passage and having sealing engagement with the periphery of said butterfly element in the closed position of said butterfly element;
passage means being defined by said valve body and communicating fluid pressure from said flow passage upstream of said butterfly element to said seal chamber, said pressure receiving base portion defining an annular groove that faces upstream and receives fluid pressure from said passage means;
said sealing portion of said sealing element being urged toward said periphery of said valve disc responsive to pressure acting within said annular groove; and
stem seal means being formed integrally with said sealing element and being in sealing engagement with said valve stem means, the sealing ability of said stem seal means also being enhanced by fluid pressure within said annular groove.

4,026,515

FLOW CONTROL APPARATUS

Marvin H. Grove, Houston, Tex., assignor to M & J Valve Company, Houston, Tex.

Continuation-in-part of Ser. No. 400,790, Sept. 26, 1973, abandoned. This application Jan. 31, 1975, Ser. No. 545,765
Int. Cl.² F16K *25/00*
U.S. Cl. 251—172 **11 Claims**



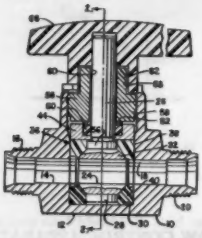
1. In fluid control apparatus, means forming a body having at least two spaced flow passages adapted to be connected to associated piping, and means including two cooperating parts movable relative to each other for permitting or arresting fluid flow through the body between passages, one of said parts comprising means forming a cylindrical surface, the other one of said parts comprising a sealing assembly, the assembly including at least one sealing member made of resilient material and substantially L-shaped in section, said member being formed to provide a generally circular flange or rim portion and a base portion to which the rim is secured, means having clamping engagement with the base portion for mounting the sealing member with the rim being free to flex a limited amount in a radial direction, one peripheral surface of the rim having a circular area located intermediate the base portion and the free edge portion of the rim and adapted to engage and form a fluidtight seal with respect to the cylindrical surface when the two parts are in interfitting relationship and in axial alignment, thereby arresting fluid flow between the passages, differential fluid pressure acting upon the rim from one of said passages tending to flex the same radially in a direction toward the cylindrical surface, means connected to one of said parts for movement of the same into and out of interfitting engagement with the other part, and means forming a part of the sealing assembly and serving to limit radial flexing of the rim under the force of fluid pressure, said means including a rigid member carried by said other one of said parts and disposed adjacent to one peripheral surface of the free edge portion of the rim of the sealing member and concentric therewith, the diameter of said last means relative to the diameter of the cylindrical surface being such as to permit the sealing assembly to have telescoping relationship between the sealing member and the rigid annular member and the cylindrical surface.

4,026,516

BALL VALVE STEM GUIDE

Stephen Matousek, Moraga, Calif., assignor to Whitey Research Tool Co., Emeryville, Calif.

Filed May 28, 1970, Ser. No. 41,494
Int. Cl.² F16K 27/06
U.S. Cl. 251—214 10 Claims



1. In a ball valve including a housing defining a valve chamber, inlet and outlet passages connected to said chamber, a ball positioned in said chamber and having at least one aperture extending therethrough, means including a cylindrical stem engaged with said ball and extending out of said housing for rotating said ball, resilient resinous material substantially filling said chamber and sealingly engaging said ball and the walls of said chamber, the improvement comprising:

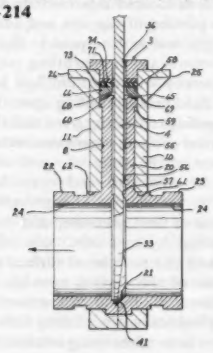
packing means about said stem including a relatively rigid first gland member closely and slidably received in said housing, said gland member having an opening through which said stem rotatably extends, an elongated recess formed axially inwardly in said gland member about the inside of said opening, said recess terminating in a bottom wall defined by said gland member and being substantially filled with a bushing of resilient resinous material; and, adjustable means engaging the outer axial end of said bushing and mounted for free movement axially of said shaft, and said first gland member for applying compressive loading to said bushing to compress said bushing into sealing engagement with said stem and to indirectly cause said gland member to apply a compressive load on the resinous material in said chamber so that substantially all of the compressive loading applied to said resilient material in said chamber is transmitted through said packing.

4,026,517

BIASABLE SEAL FOR GATE VALVES

Robert C. Still, Tucson, Ariz., assignor to New Concepts, Inc., Tucson, Ariz.

Filed Mar. 17, 1976, Ser. No. 667,599
Int. Cl.² F16K 27/04, 3/02
U.S. Cl. 251—214 12 Claims



6. A gate valve including a biasable seal disposed intermediate the gate and the throat of the gate valve chest, said seal comprising in combination:

a. a ridge extending into the throat in proximity to the end of the chest and in general engagement with the surface of the gate for establishing a seal therebetween;

b. a compression ring disposed adjacent the upper surface of the end of the chest for biasing said ridge toward the surface of the gate; and

c. packing gland means for urging said compression ring against the chest;

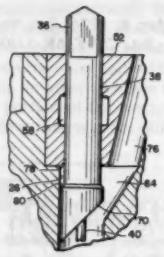
whereby, the force exerted by said packing gland means is translated through said compression ring and the chest to maintain said ridge in sealing engagement with the surface of the gate and prevent leakage through the throat of the chest.

4,026,518

BUSHING SEAL FOR VALVE-GATED INJECTION MOLD

Jobst Ulrich Gellert, 11 Newton Road, Brampton, Ontario, Canada

Filed Feb. 4, 1976, Ser. No. 655,056
Claims priority, application Canada, Apr. 10, 1975, 224358
Int. Cl.² F16K 41/14
U.S. Cl. 251—330 2 Claims



1. A valve pin bushing seal for seating receipt in a heater of a single cavity valve-gated injection mold, said bushing seal having flat upper and lower faces and a vertical bore therebetween to reciprocally receive an upper portion of the valve pin therethrough, said bushing seal extending between the upper and lower faces, said hot runner passage being separate from said vertical bore.

4,026,519

BUILDING PANEL PLACEMENT APPARATUS

Harry W. Piercy, Chico, Calif., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Continuation-in-part of Ser. No. 543,818, Jan. 24, 1975, abandoned. This application Mar. 8, 1976, Ser. No. 665,029
Int. Cl.² B60P 1/00
U.S. Cl. 254—2 R 6 Claims

1. Apparatus for supporting a building panel in place against a horizontal ceiling or vertical wall support comprising,

a base unit jointed to,

a pivotable linkage of support members joined to

a platform,

said support members comprising three pairs of spaced parallel arm members, with

said base unit pivotably mounted to a first pair of said parallel arm members, at the lower extremity of each said arm member,

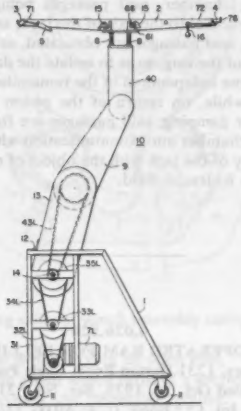
said platform mounted in non-rotatable engagement to a second pair of said parallel arm members at the upper extremity of each of said arm members, with

a third pair of said arm members pivotably linking the said first pair of arm members to the said second pair of arm members, in which

the upper extremity of each of the first pair of arm members is pivotably linked to the lower extremity of each of the

third pair of arm members, and the upper extremity of each of the third pair of arm members is pivotably linked to the lower extremity of the second pair of arm members, with

a first motorized means mounted in the base unit, said first motorized means joined to first drive means for simultaneously rotating the first pair of arm members with respect to both the said base unit and with respect to the said pair of third arm members, and



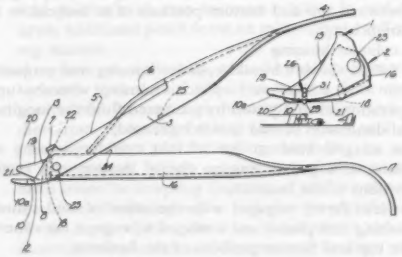
a second motorized means mounted in the base unit, said second motorized means joined to second drive means for rotating the said second pair of arm member with respect to the said third pair of arm members, such that said second motor means may rotate the platform, attached to the said second pair of arm members, with respect to the base unit, independently of the positions of the first and third pair of arm members.

4,026,520

SURGICAL STAPLE EXTRACTOR

Robert G. Rothfuss, Bellevue, Ky.; Russell C. Stone, Cincinnati, Ohio, and Matthew H. Wykoff, Bridgewater, N.J., assignors to Senco Products, Inc., Cincinnati, Ohio

Filed Mar. 5, 1976, Ser. No. 664,231
Int. Cl.² B25C *11/00*
U.S. Cl. 254—28 **16 Claims**



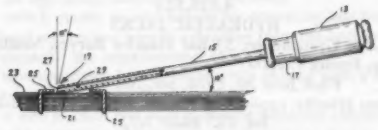
1. A manually operated extractor for a surgical staple of the type having, when implanted in the skin of a patient, an exposed crown and opposed L-shaped skin engaging legs, said extractor comprising a pliers-like tool having first and second handle elements pivotally joined together near their forward ends and being shiftable between an open position and a closed position, said first handle element having a bifurcated forward end, said bifurcations terminating in a pair of elongated anvils in parallel spaced relationship and adapted to be slipped beneath said crown portion of a surgical staple in the skin of a patient, said anvils having forward ends angled toward each other with the frontmost tips thereof being substantially contiguous, said anvils having rearward ends provided with aligned notches to receive said crown of a surgical staple, said bifurcations providing a steep upwardly and rearwardly sloping surface adjacent each of said notches to assist in locating said staple crown in said notches, a thin blade means being located between said bifurcations of said first handle element, said second handle element being operatively connected at its forward end to said blade means, said blade means having a nose portion shorter than said anvils and having a lower edge, said blade nose portion being shiftable by said second handle element between a first position when said handle elements are in said open position wherein said lower edge of said nose lies above said anvils and said notches therein and a second position when said handle elements are in said closed position wherein said nose lies between said anvils with said lower edge below said anvils, there being clearance between said nose portion and each of said anvils at least substantially equal to the diameter of said crown portion of said staple, whereby when said anvils are slipped beneath the crown portion of a staple in the skin of a patient with the crown located in said aligned anvil notches and said blade is shifted to its second position by said second handle element, said crown of said staple will be formed into a U-shape causing said L-shaped staple legs to shift upwardly and outwardly enabling them to be lifted from the skin of a patient.

4,026,521

STEEL STAPLE REMOVER

Don A. Clark, 3765 Fieldcrest Drive, Montgomery, Ala. 36111

Filed June 4, 1976, Ser. No. 692,719
Int. Cl.² B25C *11/00*
U.S. Cl. 254—28 **3 Claims**



1. In combination, a heavy steel clinched staple and a hand tool for aiding in the removal of same from a workpiece having a large number of sheets of material held together by the staple, said hand tool comprising a handle portion at one end, a shank portion extending outwardly from said handle and terminating in a shaped staple engaging end, said shank being tubular in configuration at its terminal end, and an angular contact surface extending along the lower surface at the terminal end of said shank for contacting the surface of the workpiece with the clinched end of the staple in alignment with the tubular terminal end of the shank to allow the clinched staple end to enter said shank when the lowermost portion of the shank end is positioned on the workpiece and thrust inward between the workpiece and the staple end whereby a lifting of said handle will cause the clinched staple end to be straightened.

4,026,522

POST PULLING APPARATUS

Marvin A. Dranselka, R.R. 1, Wayne, Nebr. 68787

Filed Sept. 9, 1976, Ser. No. 721,017
Int. Cl.² B66F *3/00*
U.S. Cl. 254—30 **7 Claims**

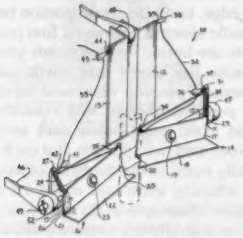
1. A post pulling apparatus adapted to be attached to a conventional tractor lifting mechanism and stabilizer coupling, the mechanism capable of reciprocal movement in a vertical direction, the apparatus comprising:

a. a substantially rigid support member having opposed

ends, said support member disposed in a substantially horizontal position and adapted to be affixed at the ends thereof to the lifting mechanism;

b. a substantially rigid stabilizing means affixed to said support member approximately midway between the ends of said support member and extending away therefrom in a vertical direction, said stabilizing means adapted to be affixed, at a point above said support member, to the stabilizer coupling;

c. clamp means for engaging the post, said clamp means



including a pair of plates pivotally mounted to said support member in angular relation to each other, each of said plates having a gripping surface, the pivot points of said plates being so located that the closest point between said gripping surfaces is above the plane of the pivot points.

d. closing means urging each of said gripping surfaces toward the closest point therebetween; and

e. opening means for selectively overcoming said closing means and thereby increasing the spacing between said gripping surfaces.

4,026,523

HYDRAULIC JACKS

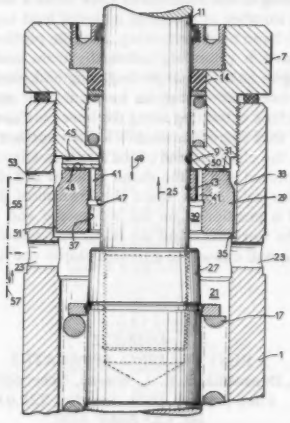
Jean Louis Gratzmuller, 33 Bld Maurice Barres, Neuilly sur Seine, France (92000)

Filed June 30, 1976, Ser. No. 701,012

Claims priority, application France, July 7, 1975, 75.21211

Int. Cl.² B66F *3/32*

U.S. Cl. 254—93 R **10 Claims**



1. Hydraulic jack with incorporated end-of-stroke damping device in which the piston is provided with at least one first damping component presenting a male element cooperating, at one of the ends of stroke, with a second damping component constituted by a ring floatingly mounted within a seating provided in the jack cylinder, said seating making possible radial wobbling of said ring, while the inner surface of said ring defines with the outer surface of said male element an annular clearance of variable section for the throttling of the hydraulic fluid, which hydraulic fluid, in the course of end-of-stroke damping, leaks from an annular chamber of variable volume, or damping chamber, delimited, in the axial direction, by an annular radial surface of said ring and by the opposed annular radial surface of the first component, said seating also making possible limited axial wobbling of said ring; said ring being hollowed out by through-going passages for re-supply of said damping chamber, said passages being hollowed out substantially parallel to the axis of the jack; and, in the damping condition, said passages are obturated, as a result of axial displacement of the ring, so as to isolate the damping chamber and render same independent of the remainder of the capacity of the jack, while, on return of the piston in the opposite direction after damping, said passages are freed so as to put the damping chamber into communication with the remainder of the capacity of the jack with the object of re-supplying said chamber with hydraulic fluid.

4,026,524

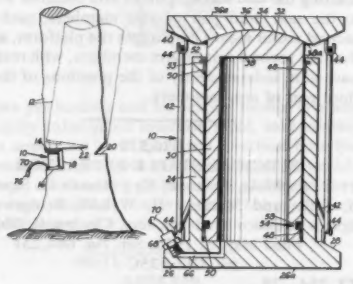
FLUID OPERATED RAM FOR FELLING TREES

Elmer R. Silvey, 1231 Dutton Road, Eagle Point, Oreg. 97524

Filed Oct. 14, 1975, Ser. No. 621,757

Int. Cl.² B66F *3/24;* A01G *23/08*

U.S. Cl. 254—93 R **7 Claims**



1. A fluid operated ram to assist in felling a tree by engagement between top and bottom portions of a backcut in the tree, comprising

a. a cylinder housing

b. a piston slidable in said cylinder housing and projecting from one end of said cylinder housing whereby upon operation of said piston by pressured fluid the longitudinal dimension of said ram is increased,

c. an integral base on one of said cylinder housing and piston arranged to engage one of the top and bottom portions of the backcut,

d. a head freely engaged with the other of said cylinder housing and piston and arranged to engage the other of the top and bottom portions of the backcut,

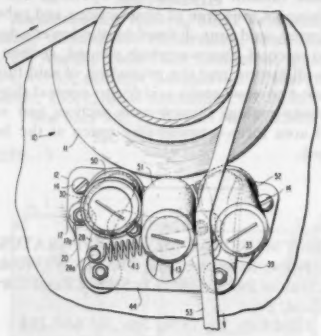
e. the engaging surfaces between said head and said one of said cylinder housing and piston comprising concave convex surfaces providing a combined tilting and laterally slidable engagement so that as the top portion of the backcut of the tree separates from the bottom portion of the backcut in the felling of the tree, said head can simultaneously tilt and adjust laterally relative to said one of said cylinder housing and piston,

f. and fluid inlet means in said ram admitting pressured fluid to said piston.

4,026,525
SELF-TAILING WINCH

Maurice G. Declercq, 7144 S. Shore Drive South, St. Petersburg, Fla. 33707

Filed Apr. 24, 1975, Ser. No. 571,369
Int. Cl.² B66D 1/30
U.S. Cl. 254—150 R 2 Claims

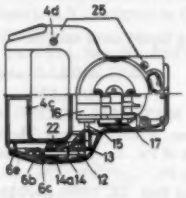


1. A self-tailing sailboat winch assembly comprising in combination:
a capstan type winch having an open end,
a rotative drum about which turns of a section of a rope are manually applied and thereafter require:
pull continuously to maintain traction of said turns with the rope receiving surface of said drum and while said drum is rotated, pull while removing and pushing away the rope which exits said drum,
a conventional tailing procedure and optionally,
said tailing is performed by said winch by engaging a section of said rope between
elements of self-tailing means provided therefore in combination with said winch comprising:
at least one offstanding roller driven by said winch to rotate with said drum,
an included pinch-finger means having spring biasing means, said pinch-finger means can be a pinch-roller, said pinch-roller may also be driven by said winch to rotate with said winch drum, cooperating with said at least one offstanding roller driven by said winch to pinch a section of said rope, retain and pull said rope exiting said winch drum and push it away while said drum is rotated,
carrier means for said offstanding roller and said pinch-finger means, include carriers thereof that are caused by said pull on said rope to move relative to said rope to apply additional pinch force on said rope in a self-energizing manner,
said carriers are, optionally, caused by said pull on said rope to move toward said winch to engage drive means to power said at least one offstanding roller and retract therefrom by spring biasing means when said rope is disengaged from said self-tailing elements,
said drive means, which may consist of obvious rotative drive trains for coupling the drive of said winch to said at least one offstanding roller, includes the use of the flange of said drum adjacent the base of said winch and rotative elements coupled to said flange used to drive said offstanding roller,
support means for retaining and constraining movement of said carrier means for said at least one offstanding roller and said carrier means for said pinch-finger means, said spring biasing means, the portion of said drive means for said at least one offstanding roller which engages the remaining portion of said drive means,
sub-support means an off-center extension of the base of said winch, fixed to the base support of said winch drum, adapted to sub-support, in a manner providing for quick removal and quick attachment, said support means all elements assembled to said support included,
said base support includes support means for said remaining portion of said drive means for said at least one roller,
said support means may be adapted to be mounted to said winch without said sub-support.

4,026,526
HOISTING GEAR

Dieter Messerschmidt, Hagen; Johannes Kluge, Wetter, and Meinolf Schleyer, Unna, all of Germany, assignors to Demag Aktiengesellschaft, Germany

Filed Mar. 24, 1976, Ser. No. 669,971
Claims priority, application Germany, Mar. 25, 1975, 2513031
Int. Cl.² B66D 1/00
U.S. Cl. 254—168 17 Claims



1. A gear hoist arrangement for lifting loads, comprising
a. a hoist unit with a motor;
b. an operating element for said hoist unit;
c. cable connections between said hoist unit and said operating element;
d. an operating handle on said element;
e. switch means on said handle for operating said hoist unit;
f. load connecting means extending from the bottom of said element; the improvement characterized by
g. said operating handle being yoke-shaped with a horizontal elongated handle piece;
h. a web at each end of said handle piece for connection to said operating element;
i. a toggle switch lever in each said web;
j. a tiltable switch lever shaft connected to each toggle switch lever;
k. a switch mounted on said operating element;
l. a switch shaft mounted on said switch; and
m. an angle gear means interconnecting one of said tiltable switch lever shafts to each end of said switch shaft.

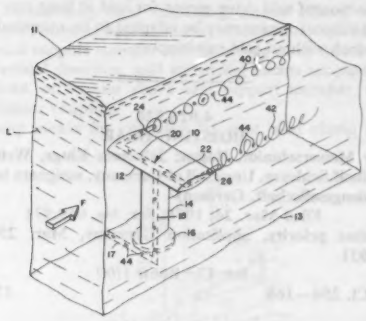
4,026,527
VORTEX GENERATOR FOR CONTROLLING THE DISPERSION OF EFFLUENTS IN A FLOWING LIQUID

Robert C. Costen, Hampton, Va., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed May 3, 1976, Ser. No. 682,416
Int. Cl.² B01F 15/00
U.S. Cl. 259—4 R 9 Claims

1. A method for controlling the dispersion of effluents in a flowing liquid comprising the steps of:
providing a body of flowing liquid having an upper boundary and a lower boundary;
providing a first vortex generator for creating a distinct self-contained recirculating first vortical flow in said liquid wherein there is essentially no liquid flow between said body of flowing liquid and said first vortical flow;
locating said first vortex generator in said flowing liquid thereby generating said first vortical flow;

injecting an effluent into said first vortical flow where it is entrained and carried downstream without dispersing into



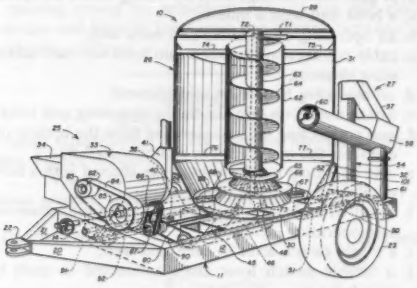
said flowing liquid until said first vortical flow has dissipated.

4,026,528

FEED MATERIAL MIXING APPARATUS

Charles M. Kline, Reinholds, and Thomas W. Waldrop, New Holland, both of Pa., assignors to Sperry Rand Corporation, New Holland, Pa.

Filed Feb. 23, 1976, Ser. No. 660,204
Int. Cl.² B01F *5/12, 7/24*
U.S. Cl. 259—7 **6 Claims**



1. Feed material mixing apparatus comprising in combination,

a. a frame,

b. a tank supported by the frame, having a top, a bottom and outer wall means for confining material, said outer wall means having two sections, a first cylindrical section and an integral second frusto-conical shaped section extending downwardly and inwardly from the cylindrical member,

c. said bottom being provided with at least two openings disposed in the bottom of said tank,

d. means for transferring material into the tank including a hopper for receiving feed material and first transfer means for conveying the material from the hopper to the tank via one of said openings,

e. means for unloading material from the tank including means for conveying material away from said tank via a second of said openings disposed in the bottom of said tank, and

f. a vertical assembly mounted within the tank for mixing material fed into the tank, said assembly comprising a vertical auger housing and rotatably mounted material advancing means having a first portion comprising a vertical auger positioned at least partly within the housing for receiving material and advancing it upwardly through said housing and a second material advancing portion below and axially aligned with said first portion for advancing material upwardly to said first portion, said second portion including a vertical auger assembly having exposed flighting extending from a frusto-conical shaped core mounted for rotation with said first section and approximately equal in length to the frusto-conical shaped wall section,

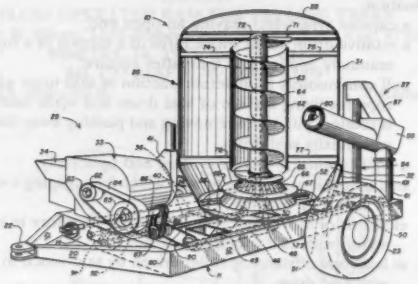
g. said tank bottom in which said openings are disposed comprising an area free of obstructions and substantially ring-shaped, said area defined by the lower edge of said integral second frusto-conical shaped section of said outer wall means, and the projection of said fursto-conical shaped core, whereby said frusto-conical shaped core, said frusto-conical shaped wall section and said ring-shaped area form a trough-like space at the bottom of said tank.

4,026,529

FEED MATERIAL MIXING APPARATUS

Charles M. Kline, Reinholds, and Thomas W. Waldrop, New Holland, both of Pa., assignors to Sperry Rand Corporation, New Holland, Pa.

Filed Feb. 23, 1976, Ser. No. 660,212
Int. Cl.² B01F *5/12, 7/24*
U.S. Cl. 259—7 **5 Claims**



1. In a mixing apparatus of the type including

a frame,

a tank supported by the frame, having a top, a bottom and outer wall means for confining feed material,

means for transferring material into the tank,

means for unloading material from said tank, and

a vertical assembly mounted within the tank for mixing material fed into the tank, said assembly comprising a vertical auger housing and rotatably mounted material advancing means having a first portion comprising a vertical auger positioned partly within the housing for receiving material and advancing it upwardly through said housing and in improved second material advancing portion, below and axially aligned with said first portion, for advancing material upwardly to said first portion, said second portion including

a. a core member having a frusto-conical outer surface converging upwardly between the bottom and the vertical auger of the first portion of the material advancing means, said outer surface having a substantially circular lower edge adjacent said tank bottom and a substantially circular upper edge located in the vicinity of the lower end of said vertical housing,

b. spiral flighting extending outwardly from said outer surface and exposed to directly engage and advance upwardly materials being mixed, and

c. a ring-shaped area defined between said circular lower edge of said core and the bottom of said outer wall means,

d. at last one rigid crop engaging element fixed to the outer surface of the core member in the vicinity of the lower edge, said element extending substantially parallel to the

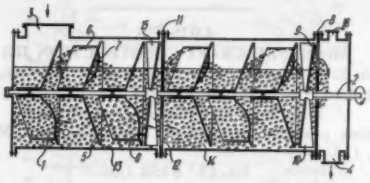
bottom for traversing said ring-shaped area under conditions where said material advancing means are rotated to mix material within the tank.

4,026,530

CONTINUOUS ACTION MIXING APPARATUS FOR BULK MATERIALS

Alexandr Alexandrovich Kavera, ulitsa Bryanskaya, 2a, kv. 35; Anatoly Anatolievich Nitkovskikh, ulitsa Moskovskaya, 62, kv. 25; Anatoly Fedorovich Leontenko, ulitsa Temrjukskaya, 64, kv. 53, and Igor Longinovich Gaidar, ulitsa Karla Libknekhta, 133/1, all of Krasnodar, U.S.S.R.

Filed May 20, 1975, Ser. No. 579,065
Int. Cl.² B01F *7/10*
U.S. Cl. 259—9 **9 Claims**



1. A continuous action mixing apparatus for bulk materials, comprising: a hollow horizontal cylindrical housing; charging means including an inlet port for charging bulk material into said housing, said charging means being arranged at one end of housing; discharging means including an outlet port for discharging bulk material from said housing, said discharging means being arranged at the opposite end of said housing, said charging means and discharging means cooperating with said housing for restricting flow of bulk material only into said housing by way of said charging means and out of said housing by way of said discharging means; a horizontally oriented, rotatably driven shaft extending within said housing; a series of tapering discs mounted on said shaft throughout the length thereof in spaced relationship and having their inner surfaces facing said outlet port, said discs serving to mix bulk material and simultaneously to advance it in a direction from said inlet port to said outlet port; each tapering disc having a blade formed on the outer surface thereof and an opening provided therethrough in front of said blade in the direction of rotation of said tapering disc, said blades being open at rear portions thereof between each blade and the preceding disc, so that some of the bulk material can flow from the region of the blade of one disc back toward an area of action of the preceding disc.

4,026,531

PHOTOGRAPHIC CHEMICAL LIQUID AGITATOR

Charles R. Luchsinger, 14 Briarwood Drive, Glen Cove, N.Y. 11542, and John Joslyn, Bayview Ave., Sag Harbor, N.Y. 11963

Continuation of Ser. No. 542,753, Jan. 21, 1975, abandoned. This application May 27, 1976, Ser. No. 690,825
Int. Cl.² B01F *11/00;* **G03D** *3/04*
U.S. Cl. 259—72 **8 Claims**

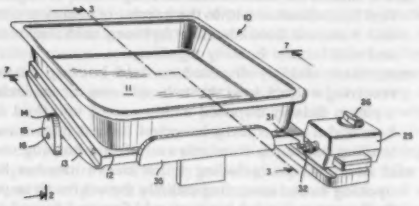
1. A liquid agitator for photographic development or the like comprising:

a normally substantially horizontally disposed tray for carrying said liquid;

means for tilting said tray from the normally substantially horizontally disposed position thereof; and

means for returning said tray to said normally substantially horizontally disposed position with an abrupt return motion jarring snap action to thereby slosh and agitate the liquid,

said means for returning said tray being operable to return



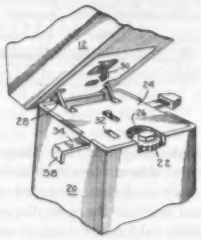
said tray freely and independently of the influence of said means for tilting said tray.

4,026,532

MIXER LOCKING STRUCTURE

Bhim S. Madan, Brockport, N.Y., assignor to General Electric Company, Bridgeport, Conn.

Filed May 14, 1976, Ser. No. 686,453
Int. Cl.² B01F *7/00*
U.S. Cl. 259—104 **7 Claims**



1. A household electric, stand food mixer having a motor-enclosed horizontal housing with a handle and removable beaters extending downwardly at one end, a bowl-supporting base with a column for pivotally and removably supporting the other end of said housing, an improved mixer locking structure comprising,

an apertured flat mounting plate fixed to the column top and having a cut-out;

leveling means operable through the cut-out to vary the horizontal housing position;

fixed hook means extending below the housing through said apertured plate;

a lock slider movable into the column parallel to said plate to engage the hook and lock the housing to the column;

said slider having means for selective hook engagement position cooperating with a selected leveling position; and

actuating means on said slider external of said column;

whereby the housing is locked to the column on a selected slider position as determined by the leveling means to prevent upward housing rotation under heavy beater loads.

4,026,533

SHOCK ABSORBER WITH CONICAL CONTROL ELEMENTS

Ransom J. Hennells, 45500 N. Territorial Road, Plymouth Township, Wayne County, Mich. 48170

Filed Aug. 29, 1975, Ser. No. 608,885
Int. Cl.² F16F *9/48*
U.S. Cl. 267—124 **17 Claims**

1. In an adjustable fluid-type energy absorber, comprising: housing means including a central tubular housing member

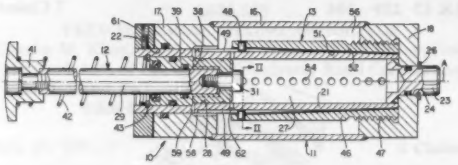
and a pair of end members positioned adjacent opposite ends of said central tubular housing member;

sleeve means disposed in said housing means for forming a first fluid chamber within the interior of said sleeve means and a second fluid chamber between said sleeve means and said tubular housing member;

ram means slidably disposed on said housing means for receiving a shock load thereon, said ram means including a piston slidably disposed within one of said fluid chambers and a piston rod connected to said piston and extending outwardly from one end of said housing means;

said sleeve means including a first sleeve member having opening means extending radially therethrough to permit fluid communication between said first and second chambers, said opening means extending substantially axially of said first sleeve member whereby movement of said piston axially of said one chamber causes fluid to flow from said one chamber through said opening means into said other chamber;

control means for varying the energy dissipation characteristics of said energy absorber, said control means including a second sleeve member disposed substantially adjacent and in concentric relationship with said first sleeve



member for controlling the flow through said opening means, one of said sleeve members having an outer conical surface thereon and the other sleeve member having an inner conical surface thereon disposed closely adjacent and opposite said outer conical surface, said inner and outer conical surfaces defining a narrow flow control passage therebetween, said opening means communicating with said flow control passage; and

adjustment means for causing relative axial displacement between said first and second sleeve members for selectively varying the size of the flow control passage between said inner and outer conical surfaces;

said adjustment means includes a control shaft rotatably supported on said housing means for rotation about an axis substantially perpendicular to the longitudinally extending axis of said sleeve means, said control shaft extending exteriorly of said housing means and having manually engageable handle means thereon, and eccentric means mounted on said control shaft adjacent the inner end thereof and disposed in engagement with an opening formed in one of said sleeve members for causing axial displacement thereof in response to angular displacement of said control shaft.

4,026,534

SHOCK ABSORBER

J. H. Barnwell, and M. T. Wilkinson, both of Ruston, La., assignors to Department of Mechanical Engineering Louisiana Tech University, Ruston, La.

Filed Feb. 2, 1976, Ser. No. 654,085

Int. Cl.[2] B60R *19/08*

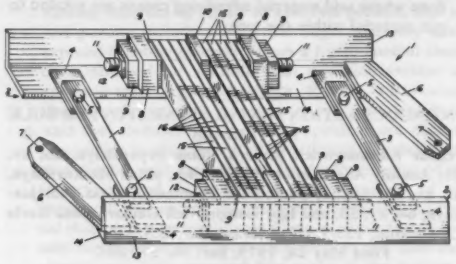
U.S. Cl. 267—139 **10 Claims**

1. A shock absorber comprising:

a. a pair of side members of substantially equal length disposed in parallel relationship to each other;

b. at least one lamination of a viscoelastic material and leaf spring in alternating configuration between said side members, and means carried by said side members for removably mounting the ends of said lamination to said side members, respectively; and

c. a pair of spacer bars disposed in essentially parallel rela-



tionship to each other and having the ends thereof pivotally mounted on said side members.

4,026,535

MODEL AIRCRAFT CONSTRUCTION JIG

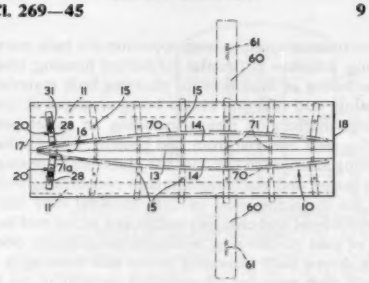
Vernon Ernest Heath, 28 Springfield Road Walmley,, Sutton Coldfield West Midlands, England

Filed June 25, 1975, Ser. No. 590,188

Claims priority, application United Kingdom, Mar. 27, 1975, 12819/75

Int. Cl.[2] B25B *1/20*

U.S. Cl. 269—45 **9 Claims**



1. A model aircraft construction jig comprising, in combination:

a. an elongated baseboard having at least one longitudinal guideline defining a reference centerline thereupon,

b. a plurality of fuselage side cramp members each having a vertically disposed clamping face,

c. means for fixing said side cramp members on the baseboard so that they are located in longitudinally-extending rows spaced at opposite sides of said reference centerline,

d. said fixing means being adjustable to provide for selective positional adjustment of each side cramp member whereby said clamping faces of the side cramp members can engage respective side walls of a model aircraft fuselage assembled on said centerline,

e. a tail unit locator, and

f. means for mounting and fixing said tail unit locator on the baseboard towards the rear end thereof in predetermined relationship to said centerline,

g. said tail unit locator having positionally adjustable guide slot means adapted to engage and locate in position portions of a model aircraft tail unit during assembly thereof and fitting to an assembled fuselage aligned with respect to said centerline,

h. said tail unit locator has a two-part construction comprising a carrier member having an upstanding post, an arm member having a forwardly-projecting arm, and adjustable connecting means connecting together the carrier member and arm member,

i. said tail unit mounting and fixing means being adapted to mount adjustably and secure said carrier member upon the baseboard,

j. said forwardly-projecting arm having an open-ended slot

for engaging and locating the tail fin and rudder portion and tail plane and elevation portions of the tail unit, and

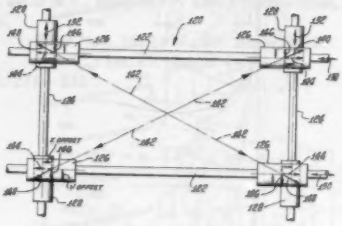
k. the adjustable connecting means being adapted to provide angular adjustment and height adjustment of the arm member upon the carrier member thereby to bring said forwardly-projecting arm into the required positions for selectively locating said portions of the tail unit.

4,026,536

SUPPORTING AND DRIVE SYSTEMS FOR *X-Y* TABLE

Daniel J. Netto, 518 S. Carondelet St., Los Angeles, Calif. 90057

Filed Dec. 1, 1975, Ser. No. 636,968
Int. Cl.² B23Q *1/02*
U.S. Cl. 269—73 **7 Claims**



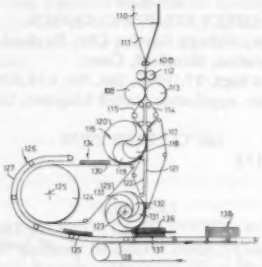
1. A supporting system for an *x-y* table, comprising four pairs of superimposed and interconnected bearings, said pairs of bearings being horizontally spaced apart and respectively located at the corners of a square or rectangle, the upper bearings of said pairs being perpendicular to the lower bearings of said pairs, and the upper bearings of said pairs being offset horizontally inwardly relative to the lower bearings of said pairs in both *x* and *y* directions to arrange said upper and lower bearings in a pyramidal array.

4,026,537

METHOD OF AND MACHINERY FOR PRODUCING BOOKBLOCKS

John William Harris, Kettering, England, assignor to Timsons Limited, Kettering, England

Filed May 13, 1975, Ser. No. 577,040
Claims priority, application United Kingdom, May 14, 1974, 21205/74
Int. Cl.² B41F *13/64*
U.S. Cl. 270—14 **1 Claim**



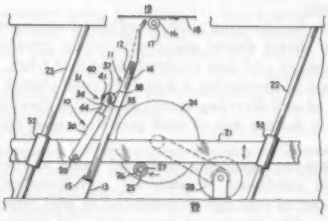
1. Apparatus for assembling a block for a double book or a double book section in a 2-up coming and going method of bookmaking in which successive lengths of a paper web have each been indentically printed so that each length shows in total a number of primary book pages each of which appears once only, the apparatus comprising supply means arranged to supply groups of book elements, each group containing all of said primary pages and consisting of leaves formed by cutting and slitting one of said lengths, said primary pages being arranged in pairs on the leaves in a head-to-head or tail-to-tail configuration with each pair of pages meeting in a junction; means for dividing said groups into first and second series, said dividing means comprising a first delivery bucket cylinder rotatable about a horizontal axis, the cylinder having a series of arcuately disposed pockets for receiving and conveying said first series of groups and a plain peripherial portion which directs said second series of groups to a second delivery bucket cylinder, the first cylinder during rotation receiving in said pockets from the supply means groups destined to be the first series of groups and presenting said plain portion of said periphery to groups destined to form the second series of groups; a rotary member rotatable about a horizontal axis and arranged to turn over a succession of said first series of groups; a combining staton; first conveying means to receive the groups of said first series from said pockets and to convey them around the rotary member by which each group is turned through 180° about an axis parallel to said junction between the two pages printed on the leaves of the group; said second delivery bucket cylinder having pockets therein, and located adjacent the combining station the pockets having mouths at the periphey of the cylinder; second conveying means for conveying groups of said second series past the plain portion of the periphery of the said first delivery bucket cylinder to said second delivery bucket cylinder to be received in the pockets thereof; third conveying means for conveying the groups of said first series from said rotary member to the combining station; the second delivery bucket cylinder and the third conveying means bringing together in pairs, to form blocks, groups of said first series and groups of the second series by bringing successive groups of the first series under successive groups of the second series whereby each block comprises one group of the first series and one group of the second series; the first and thrid conveying means and said rotary member being arranged so that passage around the latter causes each group of the first series to arrive at the combining station in an orientation in which it has been turned through 180° about an axis parallel to said junction between said two pages printed on the leaves of the group of the first series relative to the orientation of each group of the second series being delivered from the second delivery bucket cylinder at the combining station.

4,026,538

SHEET PUSHER

Michael A. Brown, Norwalk, and Hans C. Mol, Wilton, both of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Filed Apr. 12, 1976, Ser. No. 675,911
Int. Cl.² B65H *3/24*
U.S. Cl. 271—42 **6 Claims**



1. A sheet pusher comprising a supporting member, an ejection roller carried by said supporting member, means mounting said ejection roller for rotary and reciprocable movement with respect to said supporting member, means attached to said supporting member and defining a surface disposed adjacent to the peripheral surface of said ejection roller and at an angle to the direction of reciprocable move-

ment of said ejection roller, and material attached to said supporting surface to bias against said ejection roller with varying resistive force whereby said material forcibly restrains rotation of said roller when said sheet pusher is pushing a sheet while said ejection roller is adjacent one end of its reciprocable movement, provides limited rotation when a jammed sheet or an empty sheet supporting bin is encountered by said sheet pusher, and allows unrestrained free rotation of said ejection roller when said sheet pusher is moving in an opposite direction to said ejection direction while said ejection roller is at the other end of its reciprocable movement.

4,026,539

CONTROL SYSTEM OF A SORTING DEVICE

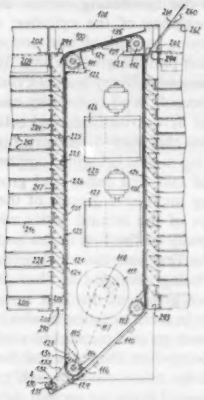
Theodorus Knoops, Asten, Netherlands, assignor to Oce-van der Grinten N.V., Venlo, Netherlands

Filed Jan. 8, 1975, Ser. No. 539,335

Claims priority, application Netherlands, Apr. 2, 1974, 7404437

Int. Cl.² B65H 29/60

U.S. Cl. 271—173 **7 Claims**



1. Apparatus for the assorted collection of sheets, comprising

a. a series of bins situated along a track;

b. means for transporting sheets to be assorted in succession along said track;

c. means positionable selectively in said track for diverting either a sheet or a succession of sheets from said track into any selected one of said bins;

d. control means for positioning said diverting means so as to divert the successive sheets into predetermined bins respectively pertaining to said sheets, said control means including

1. means for changing positions of said diverting means so as to divert sheets selectively into a predetermined number of said bins counted along said track,

2. means for producing a signal for each change of position of said diverting means to divert a sheet or sheets into a further bin of said predetermined number of bins,

3. means for registering each said signal and producing count conditions respectively corresponding to the number of said signals produced as said positions are changed to divert said sheets into said predetermined number of bins and

4. a memory device connected with said registering means for storing a signal condition corresponding to the count condition produced by said registering means when said diverting means have been positioned to divert a sheet or sheets into the last bin of said predetermined number of bins; and

e. sorting-up means operable according to said signal condition stored in said memory device after sheets have been diverted selectively into said predetermined number of bins for causing said diverting means to be positioned further so as to divert sheets selectively into bins subsequent in said series to said predetermined number of bins.

4,026,540

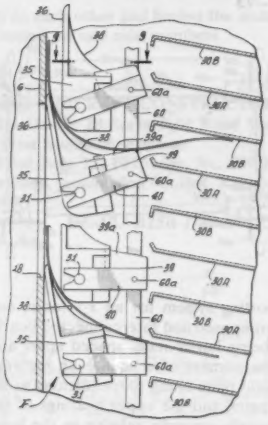
SELECTIVE TRAY SHEET SORTING MACHINE

Frederick J. Lawrence, 801 Miramar Ave., San Francisco, Calif. 94112

Filed June 10, 1975, Ser. No. 585,686

Int. Cl.² B65H 29/60

U.S. Cl. 271—173 **8 Claims**



1. In a sorting machine having sheet feeding means including sheet carrying belts, receiver means for successively receiving the sheets from said belts, said receiver means including a stack of sheet receiver trays having input ends past which said belts travel, and finger means actuable between open and closed positions for picking off successive sheets from said belts and directing said sheets into said trays: the improvement wherein said stack of trays includes sets of pairs of trays, and means are provided for adjusting the relationship between said finger means and said sets of trays between first and second conditions in which said finger means alternately successively direct sheets into one of the trays of successive sets.

4,026,541

SHEET STRIPPING DEVICE

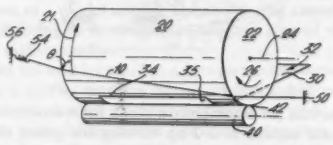
Edric R. Brooke, Welwyn Garden City, England, assignor to Xerox Corporation, Stamford, Conn.

Filed Sept. 17, 1975, Ser. No. 614,036

Claims priority, application United Kingdom, Oct. 25, 1974, 46240/74

Int. Cl.² B65H 29/56

U.S. Cl. 271—174 **1 Claim**



1. A device for stripping sheet material from a surface moving relative thereto including:

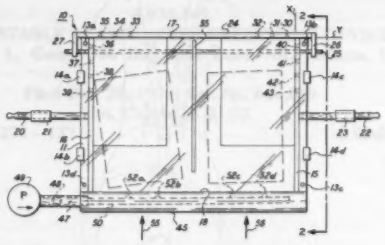
flexible filament means disposed across the surface at an acute angle to the direction of relative movement there-

between and having at least a portion thereof in general line contact with the surface, said filament means being connected to spring means on one end, said spring means holding said filament means in tension and allowing lateral displacement thereof in response to engagement with said sheet material.

4,026,542
DUAL REGISTRATION APPARATUS

Klaus K. Stange, Pittsford; Richard E. Smith, Webster; Thomas J. Hamlin, Macedon, and James R. Cassano, Penfield, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Nov. 28, 1975, Ser. No. 636,335
Int. Cl.² B65H *9/00*
U.S. Cl. 271—236 **13 Claims**



1. Apparatus for registering a first sheet with a first set of orthogonally related surfaces and a second sheet with a second set of orthogonally related surfaces, each sheet having a length and width within predetermined ranges, comprising:

a. a sleeve for internally accommodating said sheets, one surface of each of said sets being located within the sleeve;

b. a retractable gate located at one end of the sleeve, the other surface of each of said sets being located on the gate; and

c. means for providing in the sleeve a first fluid stream having velocity components normal to the first set of surfaces and a second fluid stream having velocity components normal to the second set of surfaces, whereby said streams move a pair of sheets in the sleeve into registration.

4,026,543
DOCUMENT ARTICLE HANDLING CONTROL

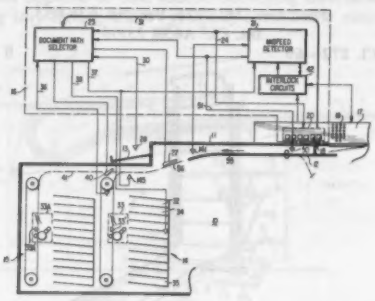
Ralph Joseph Leclere, Boulder County, Colo., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 28, 1975, Ser. No. 636,252
Int. Cl.² B65H *29/60, 7/02*
U.S. Cl. 271—259 **70 Claims**

59. The method of operating a document reproduction machine capable of single or plural copy run reproduction modes,

the steps of:

supplying copies of plural separate single copy runs in a single transport path at a given time during the single copy reproduction mode; and

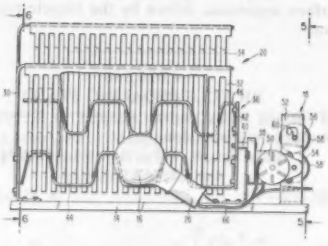


limiting copies in said single transport path to a given copy run in a plural copy reproduction mode.

4,026,544
BURNING LOGS SIMULATOR

H. Robert Plambeck, 106 Cavo Drive, and H. Robert Plambeck, III, 18 Kimball Drive, both of Poughkeepsie, N.Y. 12603

Filed May 5, 1976, Ser. No. 683,297
Int. Cl.² A63J *5/00*
U.S. Cl. 272—14 **11 Claims**



1. A fire sound simulator comprising:

a first member;

a second member;

sound motive means for moving one of said members relative to the other;

looped material mounted on one of said members;

hooked material mounted on the other said members;

said members being juxtaposed to interengage said hooked and looped materials whereby said relative movement causes portions of said hooked and looped material to engage continuously whereby such engagement and disengagement produces sounds simulating those of a fire.

7. A light flicker including:

a light source;

curtain means of two spaced curtains of downwardly depending strips of light reflecting material disposed adjacent said light source;

flicker motive means;

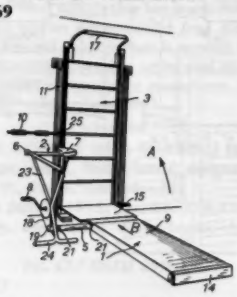
a serpentine rod means disposed between said curtain means for engaging said downwardly depending strips so as to mechanically agitate same upon rotation;

said rod means being supported from said curtain means at one end and being connected to said flicker motive means at one end and being connected to said flicker motive means for rotation at an opposite end whereby light from said light source reflected from said curtain strips upon agitation produces a light flickering sensation.

4,026,545
PHYSICAL EXERCISE APPARATUS

Rolf Schönenberger, Stapferstrasse 35, 8006 Zurich, Switzerland

Filed Nov. 25, 1975, Ser. No. 635,053
Int. Cl.² A63B 23/06
U.S. Cl. 272—69 8 Claims

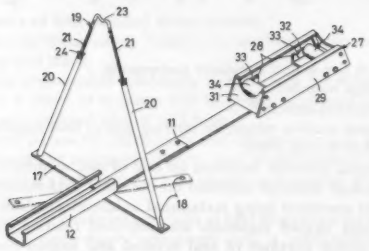


1. Physical exercise apparatus comprising
a bicycle-type drive system (2) including a saddle (7), bicycle-type crank (8),
and means (24) supporting said bicycle-type drive system and said saddle on a support surface;
an endless movable running surface apparatus (1);
and means (5, 21) rotatably coupling the bicycle-type crank and the endless movable running surface apparatus for simultaneous physical exercise by two persons, one person exercising by sitting on said saddle and operating the crank of the bicycle-type drive system and the other exercising by walking, jogging or running on the movable surface apparatus, driven by the bicycle-type drive system.

4,026,546
BICYCLE PEDALING STAND

Hisashi Omori, Kobe, Japan, assignor to Kabushiki Kaisha Kawamura Saikuru, Japan

Filed Feb. 9, 1976, Ser. No. 656,694
Int. Cl.² A63B 69/16
U.S. Cl. 272—73 3 Claims

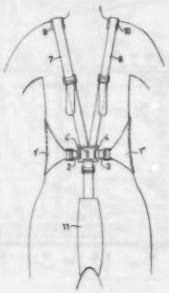


1. A bicycle stand and training roller, which comprises a bicycle wheel supporting body which comprises a base plate strip and two side-walled, elongate bicycle wheel-supporting members each fixed to said base plate by rivets at each of the longitudinal ends thereof, one member for holding the front wheel stationarily and the other member incorporating rollers so as to support the rear wheel rotatably on said rollers, and a frame for uprightly sustaining the bicycle which comprises a strip of plate having holes at each of the logitudinal ends thereof and being pivotally fitted by one of said rivets in a horizontally-semicircularly rotatable state at its intermediate portion to the joint of the base plate and the front wheel-holding member, and two pipes extending from the ground through said holes upwardly in their mutually-approaching directions, two elongate bolts being inserted in said pipes respectively at their upper ends, the length of the inserted portion of said bolts being adjustable by wing nuts fitted one each around said bolts, said bolts at their upper ends joining each other by the medium of a hook of a mountainlike form with its summit being centrally recessed downwardly and the lower ends of its sloping portions connecting to upper ends of said bolts by screws, said downwardly recessed portion being adapted to accept a bicycle at the point where the fork joins the front of the frame of said bicycle.

4,026,547
BELT WITH ADJUSTABLE BACK SUPPORT PLATE

Marianne Silverstolpe, Nora Strand 3, 182 34 Danderyd, and Lennart Silverstolpe, Skytteholmsvagen 26, 171 44 Solna, both of Sweden

Filed Aug. 12, 1975, Ser. No. 603,817
Claims priority, application Sweden, Aug. 19, 1974, 7410543
Int. Cl.² A63B 7/02
U.S. Cl. 272—109 10 Claims



1. A back belt to be used by sailors when sailing, said belt adapted to extend around the fork or crotch, shoulders and waist of the sailor and having: a trapeze hook device at the front for attachement to a trapeze line; a supporting plate; a back portion with means thereon to locate said supporting plate on the back portion, said back portion being long enough to extend over a substantial part of the back of a sailor from adjacent the fork and up to adjacent the shoulder blades, and having two lateral side portions attached thereto at intermediate locations; said side portions being adapted to wrap around the waist of the sailor and each side portion having connection means releasably connected to said trapeze hook device; and adjustable means connecting between the supporting plate and the trapeze hook device including means for passing over the shoulders and means for passing under the fork of the sailor to enable independent adjustment of the vertical location of the supporting plate on the back of the sailor.

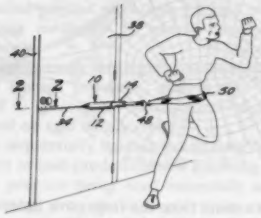
4,026,548
SPRING TYPE EXERCISE DEVICE

Daniel Lee Birdwell, 212 Burlington Lane, Huntington Beach, Calif. 92636

Filed July 2, 1975, Ser. No. 592,560
Int. Cl.² A63B 21/04
U.S. Cl. 272—136 6 Claims

1. An exercise device comprising:
first and second members longitudinally extensible and retractable relative to one another, one of said members being adapted for attachment to a fixed anchorage, and the other of said members being adapted for mounting upon an individual; and
spring means characterized by a plurality of helical turns extending longitudinally relative to said first and second

members and attached at one end to said first member, said second member including an adjuster portion adjustably disposable between selected turns of said helical turns thereby to adjust the bias developed upon extension



of said first and second members, certain of said helical turns being progressively larger in diameter as they proceed in a direction away from the point of attachment of said spring means to said first member.

4,026,549

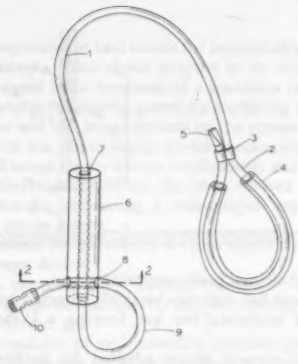
ADJUSTABLE ELASTIC TYPE EXERCISING DEVICE

William L. Gunn, 560 Highpoint Lane, NE., Atlanta, Ga. 30342

Filed Dec. 29, 1975, Ser. No. 644,859

Int. Cl.² A63B *21/02*

U.S. Cl. 272—137 **5 Claims**



1. An elastic exercising device for developing and strengthening the wrist, arm, and shoulder muscles, particularly those associated with playing tennis, comprising: a single elastic cord, the ends of which are encased to prevent fraying; a padded loop in one end of the cord through which an arm may be extended; a handle of elongated shape having through which the cord passes to vary the length of the cord between the loop and the handle and to secure the handle in a fixed selected position.

4,026,550

CONTINUOUS FEEDER

Emil Klenk, Murrhardt, Germany, assignor to Maschinenbau Oppenweiler GmbH, Oppenweiler, Germany

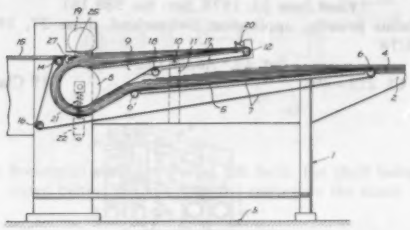
Filed Jan. 23, 1976, Ser. No. 651,822

Claims priority, application Germany, Jan. 24, 1975, 2502790

Int. Cl.² B65H *1/22*

U.S. Cl. 271—151 **8 Claims**

1. A circular sheet feeding apparatus comprising a lower loading tray for loading and transporting uneven stacks of sheets in a first direction, a rotatable reversing drum for receiving the sheets from said loading tray and conveying them in a second direction, a pick-up tray disposed above said loading tray for receiving sheets conveyed by said reversing drum, means for extracting sheets from said pick-up tray in a direction opposite to said second conveying direction, said loading tray having a first generally-horizontally extending



portion and a second portion inclined downwardly from said first portion, said second inclined portion having a leading end and a trailing end, and wherein said first portion of said loading tray and at least said leading end of said second portion are disposed at an elevation above the bottom of said reversing drum.

4,026,551

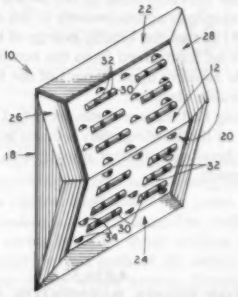
BASEBALL PITCHER'S PRACTICE TARGET

Charles W. Larson, 8211 Mango, Morton Grove, Ill. 60053

Filed Apr. 9, 1976, Ser. No. 675,527

Int. Cl.² A63B *69/40*

U.S. Cl. 273—26 A **5 Claims**



1. A baseball pitcher's target comprising:

a rebound wall surface defined by opposed side walls and opposed end walls, said wall surface including a frontal area divided into a downwardly and rearwardly tapered lower half section and an upwardly and rearwardly tapered upper half section, said upper and lower half sections being provided adjacent each of said side walls with vertically-extending rearwardly and outwardly tapered portions;

a plurality of elongated notched elements secured to said frontal area adapted when struck by a ball to impart to the ball a laterally directed force component;

and a plurality of arcuately contoured elements secured to said frontal area adapted when struck by a ball to impart to the ball a vertically directed force component.

4,026,552

BOWLING ALLEY BOWLING BALL SHOCK ABSORBER MECHANISM

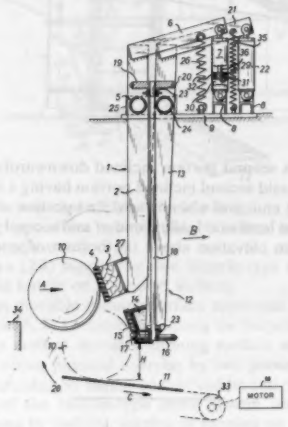
August Schmid, Schwerzenbach, Switzerland, assignor to Patentverwertungs-und Finanzierungsgesellschaft Serania AG, Glarus, Switzerland

Filed June 23, 1975, Ser. No. 589,181

Claims priority, application Switzerland, June 27, 1974, 8825/74

Int. Cl.² A63D 5/02

U.S. Cl. 273—49 19 Claims



1. In combination with a moving bowling ball, a bowling alley bowling ball shock absorber mechanism to accept the kinetic energy of said moving bowling ball and having a shock absorbing element (1) mounted for movement in the direction of movement of the bowling ball, and means rigidly secured to the shock absorbing element (1) temporarily storing and then dissipating kinetic energy imparted to said element upon impact with said moving ball, and subsequent deflection of said element,

wherein the movable mass of the shock absorbing element (1) corresponds approximately to the mass of the bowling ball (10) so that the kinetic energy of the moving bowling ball will be transferred from the bowling ball (10) to the movable element upon impact of the bowling ball against the movable element;

and bowling ball transport means (16, 17) extending transversely to the bowling alley located to be engaged by the braked bowling ball after impact with said shock absorbing element.

4,026,553

RACKET FOR TENNIS, BADMINTON, SQUASH OR THE LIKE

Dante Vendramini, 17, rue Jean Dussourd, Asnieres, France (92600)

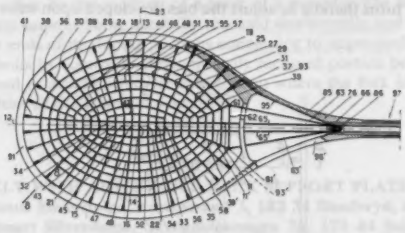
Filed Mar. 6, 1975, Ser. No. 556,162

Claims priority, application France, Mar. 11, 1974, 74.08201

Int. Cl.² A63B 51/12

U.S. Cl. 273—73 E 7 Claims

1. A netting member for tennis or badminton rackets of the type having a grooved frame with holes extending therethrough from the interior to the exterior of the frame, comprising; a network consisting of plastic material which is reinforced with glass fibers and comprises at its periphery strands with free end portions of substantially circular cross section and distributed in the same way as the holes of the frame, each strand having at its free end a loop and the length of the strands being such that, after threading through the respective



holes, the loops extend from the respective holes exteriorly of the frame.

4,026,554

FOOTBALL GOAL POSTS WITH MESSAGE MATRIX

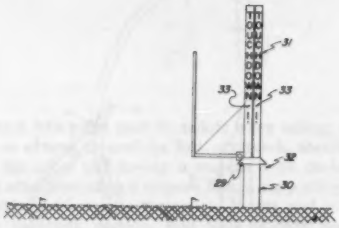
George E. Karkoska, Berwyn, Ill., assignor to G.E.K. Enterprises, Inc., Chicago, Ill.

Continuation-in-part of Ser. No. 378,796, Aug. 8, 1973, Pat. No. 3,856,302. This application Dec. 23, 1974, Ser. No. 536,001

The portion of the term of this patent subsequent to Dec. 24, 1991, has been disclaimed.

Int. Cl.² A63B 67/00

U.S. Cl. 273—55 R 2 Claims



2. A football goal post comprising:

a horizontal bar with two vertically directed bars attached to said horizontal bar and forming a U-shaped target means;

goal post support means adapted for anchoring to the ground; and

vertical reading meassage matrix extending from said goal post support means including rows of lights operationally controlled by computer program to form desired message.

4,026,555

TELEVISION DISPLAY CONTROL APPARATUS

Wallace Kirschner, Trumbull, and Lawrence Martin Haskel, Danbury, both of Conn., assignors to Alpex Computer Corporation, Danbury, Conn.

Filed Mar. 12, 1975, Ser. No. 557,484

Int. Cl.² G06F 3/14; G06K 15/20

U.S. Cl. 273—85 R 17 Claims

1. Display control apparatus for use with a television receiver including video signal input terminals, a display tube, and means for scanning said display tube at a predetermined rate, comprising

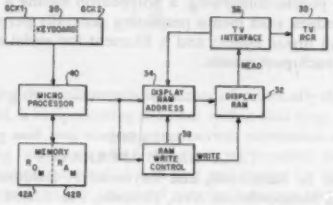
memory means having a multiplicity of discrete digital storage positions, each of said storage positions corresponding to a preselected image area of said display tube,

data processor means including storage means for storing therein digital data representing a plurality of prescribed

image devices, wherein one of said image devices is a ball intended to move continuously on the display for at least some period of time, and wherein said data processor storage means has stored therein data corresponding to preselected increments of ball movement in horizontal and vertical directions, said increments defining different preselected angular directions for said ball image device and being measured by preselected numbers of said image areas,

means for selectively writing digital data into selected ones of said storage positions, said storage positions being selected to correspond to a predetermined image to be displayed on said display tube,

means for sequentially reading stored data from said storage positions at said predetermined scanning rate, with each storage position being read essentially as the predetermined image area of the display tube corresponding to that storage position is being scanned, and



means responsive to said means for sequentially reading for generating a video signal adapted to be coupled to the video signal input terminals of a television receiver.

14. Apparatus for playing games by displaying and manipulating player and ball image devices on the screen of a display tube, wherein the player image device is manually controlled and the ball image device moves continuously and is deflected from said player image device, the improvement comprising:

first means for generating a video signal representing a player image device;

second means for generating a video signal representing a ball image device;

manually operable game control means for moving said player image device linearly and for rotating said player image device; and

means responsive to said manually operable game control means for causing said second means to generate a video signal representing the ball image device deflected in one of a plurality of preselected directions.

4,026,556

GAME APPARATUS EMPLOYING BALLS AND FRAME

Jacob H. Taylor, and Madge G. Taylor, both of Washington, W. Va., assignors to The Raymond Lee Organization, Inc., a part interest

Filed Feb. 9, 1976, Ser. No. 656,179

Int. Cl.² A63D *3/00*

U.S. Cl. 273—123 R **1 Claim**

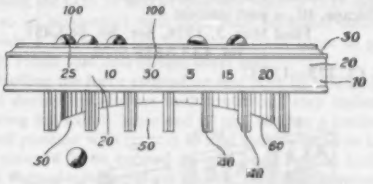
1. Game apparatus comprising:

a plurality of balls of like diameter;

a horizontally elongated member;

a plurality of parallel partitions extending vertically downwardly from the member and resting upon a playing surface to keep the member in a horizontal position, the partitions being spaced from each other at regular distances which are greater than the diameter of any ball, so as to form a plurality of vertical channels through which the balls may be rolled;

a semi-circular fence attached to the ends of the member and forming a pen behind the partitions to enclose balls rolled between the partitions between the rear ends of the partitions and the fence; and



a horizontal shelf for storing the balls, the shelf being located behind the member and resting on the fence.

4,026,557

BOARD GAME APPARATUS

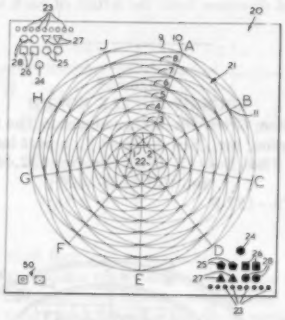
Paul Antony Hammet LeBrun, The Wilderness, 284 Wolverhampton Rd. West, Bentley, Walsall, Staffordshire, and Nigel Gordon Backhurst, 7 Lime Road, Wednesbury, West Midlands, both of England

Filed Oct. 7, 1975, Ser. No. 620,315

Claims priority, application United Kingdom, Oct. 8, 1974, 43476/74

Int. Cl.² A63F *3/00*

U.S. Cl. 273—134 D **20 Claims**



1. Apparatus comprising:

a) a board and pieces;

b) the pieces comprising two differently colored sets;

c) the board comprising a game zone having paths defined thereon, and a central zone within the game zone;

d) said paths including a set of at least five endless paths in an expanding series from an inner endless path of the series to an outer endless path of the series, a set of at least five direct paths which extend directly outwards from said inner endless path to said outer endless path so that points of intersection are defined whereat said direct paths intersect the endless paths, and a set of at least five oblique paths each of which extends obliquely outwards beginning at one of said points of intersection between said inner endless path and a direct path to one of said points of intersection between said outer endless path and a direct path to link all said endless paths with an equal number of direct paths at respective points of intersection;

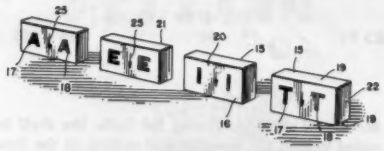
e. said oblique paths extending outwardly to successive points of intersection between the endless paths and the direct paths;

f. the paths being such as to permit the pieces to be placed at or on points of intersection whereby to permit a game to be played according to rules for moving the pieces.

4,026,558
WORD GAME USING LETTERED TILES

Henry A. Patin, Chicago, Ill., assignor to Barbara J. Patin, Chicago, Ill., a part interest

Filed Mar. 3, 1976, Ser. No. 663,451
Int. Cl.² A63F 9/20
U.S. Cl. 273—137 C 5 Claims

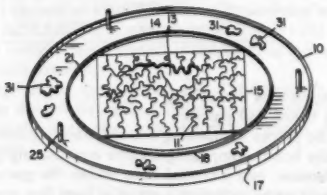


1. A game consisting of a first group of a plurality of tiles and a second group of a plurality of tiles, each of the tiles of the first group bearing two identical letters of the alphabet and each of the tiles of the second group bearing two different letters of the alphabet, each of the tiles of said frist group being provided with indicia means indicating a single direction of play transverse to the direction in which the letters thereon are arranged, each of the tiles of both groups being provided with first means for identifying one of the letters on the tiles as belonging to a first set of letters and second means for identifying the other letter on the tile as belonging to a second set of letters, the first set of letters comprising all of the letters identified by the first identifying means and the second set of letters comprising all of the letters identified by the second identifying means, whereby a series of words can be formed in an indicated direction from the letters of each set.

4,026,559
JIGSAW PUZZLE BOARD

Joe D. Carlton, Greenville, S.C., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Nov. 17, 1975, Ser. No. 632,443
Int. Cl.² A63F 9/00
U.S. Cl. 273—157 R 1 Claim



1. A board on which a jigsaw puzzle may be assembled, comprising

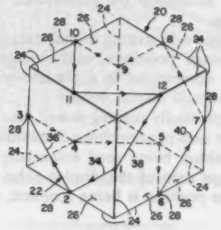
a platform, the top surface of which is fitted with a pair of concentric circular upraised ridges uniformly spaced from each other that are each fixed to the platform, with the inner circular ridge enclosing a central area of the platform on which a jigsaw puzzle may be assembled,

a ring shaped tray of a size to fit between the circular ridges, said tray freely resting on the top surface of said platform with said tray being freely rotatable with respect to the platform, and with said circular ridges being spaced apart by a distance to permit pieces of a jigsaw puzzle to rest on the tray, in which the tray is fitted with gripping means extending from the top surface of the tray, together with a set of upraised ridges mounted to the platform in the central area of said platform, said set of ridges serving as borders of an area in which a jigsaw puzzle may be assembled.

4,026,560
PUZZLE

Jim Meyer, 40 Fairview Ave., Tuckahoe, N.Y. 10707

Filed June 9, 1976, Ser. No. 694,082
Int. Cl.² A63F 9/06
U.S. Cl. 273—159 6 Claims



1. A puzzle comprising: a polyhedron having a plurality of linear edges; post means projecting generally perpendicularly from all linear edges; and a filament for serial engagement about each post means.

4,026,561
GOLF GAME APPARATUS

Blanche N. Baldorossi, and Raymond F. Baldorossi, both of 3702 Meadowbrook Ave., Orlando, Fla. 32808

Continuation-in-part of Ser. No. 461,511, April 16, 1974, abandoned. This application May 1, 1975, Ser. No. 573,773
Int. Cl.² A63B 69/36, 53/04
U.S. Cl. 273—193 R 3 Claims

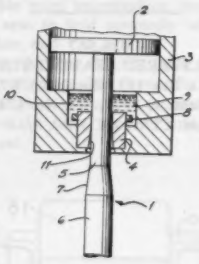
1. Apparatus which permits a game of golf to be played in a limited area, approximately one-fifth the length of an average 18 hole golf course, comprising a large golf ball and a set of golf clubs having heads of large size, said ball having a diameter of 4.2 to 5 inches, a weight of 2 to 2½ ounces, and a weight-to-volume ratio between 0.03 and 0.06, each of the clubs of said set of clubs having a head having a weight very similar to that of a regulation golf club, and a face inclined at approximately the angle of the corresponding regulation golf club, each of said faces, however, having a surface area of between 12 and 16 square inches, the relationship between said ball and each of said clubs being such as to permit a form of play action very much like the play action of regulation golf in that a player will be able to utilize an unrestricted swing in hitting said ball and obtain a feel very similar to that received when he swings a regulation golf club and hits a regulation golf ball, the ball, however, traveling for a comparatively short distance because of its small weight-to-volume ratio.

4,026,562

SEALS

Alan Wycliffe Sparrow, Peterborough, England, assignor to Perkins Engines Limited, London, England

Filed May 27, 1975, Ser. No. 580,647
Claims priority, application United Kingdom, June 5, 1974, 34859/74
Int. Cl.² F16J 15/56
U.S. Cl. 277—1 8 Claims



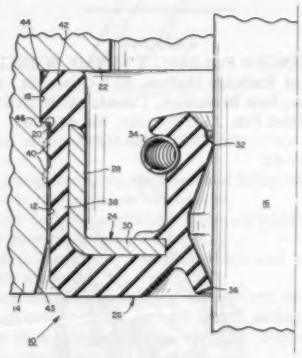
1. A sealing device comprising: a ring of plastically deformable material, a reciprocating member within said ring, means for retaining said ring stationary to permit movement of said reciprocating member relative thereto, a tapered annulus generatable upon one end of said ring and means for deforming said ring to generate a tapered annulus between said reciprocating member and said ring, said tapered annulus causing pumping of fluid in the direction of movement toward the tapered end of said ring.

4,026,563

OIL SEAL WITH LOCKING BEAD AND O. D. SEALING RIB

Dean R. Bainard, Bethel Township, S.C., assignor to Garlock Inc, Rochester, N.Y.

Filed Mar. 23, 1976, Ser. No. 669,668
Int. Cl.² F16J 15/32
U.S. Cl. 277—1 5 Claims



1. In a method for positively retaining a seal in a housing bore in sealing contact with the bore, against which bore only a minimum of radially outwardly directed force may be exerted, the improvement comprising the steps of:

a. providing an oil seal comprising an annular shell and an elastomeric sealing element bonded to the shell and having at least one annular O.D. sealing rib and also an annular locking bead extending axially inwardly beyond an axially inner end of the shell and having an O.D. greater than the O.D. of said at least one sealing rib, the locking bead having a locking shoulder for engaging a mating shoulder in a retaining groove in the I.D. of said bore,

b. forming the O.D, of said at least one annular O.D. sealing rib so as to contact said bore with sufficient force to provide a fluid seal but with insufficient force to positively retain said seal in said bore, and

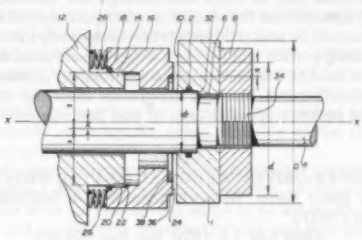
c. controlling the force exerted on said bore by said locking bead during installation, said controlling step including locating the axially inner end of said shell at a predetermined position with respect to said locking bead to keep the outward force exerted on said bore by said locking bead during installation no greater than that exerted by said at least one O.D. sealing rib.

4,026,564

ROTARY SHAFT FACE SEAL

Raymond Metcalfe, Chalk River, Canada, assignor to Atomic Energy of Canada Limited, Ottawa, Canada

Filed Aug. 20, 1976, Ser. No. 716,357
Claims priority, application Canada, Dec. 23, 1975, 242399
Int. Cl.² F16J 15/34
U.S. Cl. 277—96.1 5 Claims



1. A rotary shaft face seal, comprising:

a. a rotor sealed on the rotary shaft and secured thereto for rotation therewith and against longitudinal movement along the rotary shaft, the rotor having an annular-shaped seal face on one side,

b. a partition through which the rotary shaft extends for relative rotation therewith, the partition having an extension which is radially eccentric with the axis of rotation of the rotary shaft and has the rotary shaft extending therethrough,

c. a stator on the rotary shaft and sealed on the tubular extension of the partition, the stator being secured against rotation to the tubular extension and slidable relative thereto in the direction of the rotary shaft, the stator having an annular-shaped seal face of smaller outside diameter than that of the seal face of the rotor, the annular-shaped seal face of the stator opposing the seal face of the rotor and being substantially coaxial with the tubular extension,

d. resilient means resiliently urging the annular-shaped seal face of the stator into sealing contact with the seal face of the rotor to retard the escape of pressurized fluid therebetween, and wherein

e. the outside diameter 'D' of the annular-shaped seal face of the rotor is not less than:

$d + 2x$, where

d is the outside diameter of the annular-shaped seal face of the stator, and

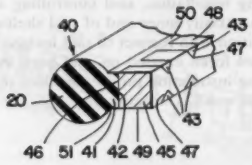
x is the radial eccentricity of the tubular extension.

4,026,565

SEALED STATIC JOINT AND GASKET THEREFOR

Jerry G. Jelinek, La Habra, Calif., assignor to Parker-Hannifin Corporation, Cleveland, Ohio

Filed Mar. 10, 1975, Ser. No. 556,794
Int. Cl.² F16J 15/02; F16L 19/02
U.S. Cl. 277—180 8 Claims



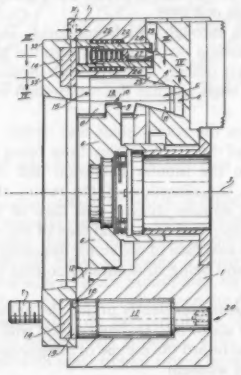
1. A gasket for sealing the joint between a pair of members having opposed surfaces for contacting axially opposite sides of the gasket, said gasket comprising a first member of readily deformable material and a second member of relatively rigid material, said first member being continuous so as to form a closed loop and including a sealing portion and a retainer portion, said retainer portion being solely on one side of the sealing portion and having substantially flat and parallel axial end faces, said retainer portion being of substantially uniform thickness between said end faces, said sealing portion being devoid of grooves and projecting axially beyond both said axial end faces of said retainer portion, the surface of said sealing portion intersecting said axial ends of said retainer portion such that an axial line through the intersections is radially spaced from the second member, said second member being carried by said retainer portion completely exteriorly of said sealing portion and having a length in said axial direction that is at least 60% of the length of said retainer portion in said axial direction but which is no greater than the minimum distance between opposite ends of said first member.

4,026,566

POWER-DRIVEN WEDGE-ACTIVATED CHUCKS

Günter Horst Röhm, Heinrich-Rohm-Str.50, Sontheim, Germany (7927)

Filed July 12, 1976, Ser. No. 704,696
Claims priority, application Germany, July 29, 1975, 2533803
Int. Cl.² B23B 31/06, 31/16
U.S. Cl. 279—121 7 Claims



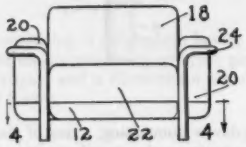
1. A power-actuated chuck, comprising:
a chuck body having an axis;
a plurality of radially shiftable jaws guided on said body and formed with rearwardly open sockets inclined to said axis;
respective axially shiftable wedging members on said body having wedging formations receivable in said sockets for radially shifting said jaws upon axial displacement of said wedging members;
means engaging said members for axially shifting same; and
a guard ring angularly displaceable on said body about said axis, said guard ring having respective recesses alignable with said members in one angular position of said ring to receive said members and enable full withdrawal of said formations from said sockets.

4,026,567

UPHOLSTERED SEATING SYSTEM

Ralph K. Rye, P. O. Box 157, Hope, N.J. 07844

Filed Sept. 1, 1971, Ser. No. 176,880
Int. Cl.² A47C 7/00, 7/14
U.S. Cl. 297—445 6 Claims



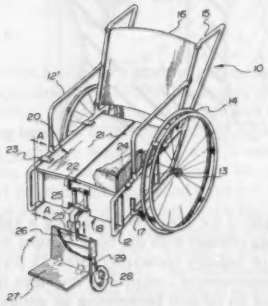
1. A seating unit comprising:
a generally rectangular, planar rigid platform having two side portions and two end portions, said side and end portions collectively defining a generally rectangular interior opening in said platform;
at least one arm frame means having an outwardly extending bracket;
means defining a plurality of grooves in said platform adapted to receive the outwardly extending bracket of at least one of said arm frame means;
means for securing said arm frame bracket to said platform;
a back cushion;
means for supporting said back cushion on said platform; and,
a seat cushion positioned in superposed relation on said platform.

4,026,568

TRIPLE HINGED FOLDING T FRAME WHEELCHAIR

Beverly Grant Rutledge Hallam, 212 Queen St., Suite 302, Fredericton, New Brunswick, Canada (E3B 1A8)

Filed Feb. 23, 1976, Ser. No. 660,701
Int. Cl.² B62B 11/00
U.S. Cl. 280—42 12 Claims



1. A foldable wheelchair frame, comprising:
a pair of sides arranged in spaced parallel relation, each having a rearwardly disposed outer portion adapted to carry a wheel spindle;
seat support means disposed transversely between the sides,

said support means having an upper surface adapted to support a seat, first free ends flexibly connected to opposed first portions of the sides and a first flexible joint intermediate the free ends which permits the support means to fold rearwardly when the sides are drawn together;

a seat disposed transversely between the sides above said support means, the seat having second free ends flexibly connected to opposed second portions of the sides and a second flexible joint intermediate the free ends which permits the seat to fold upwardly when the sides are drawn together; and

a bar carried by the first flexible joint and adapted to be longitudinally displaceable forwardly out of and rearwardly into the frame, whereby rearward displacement of the bar draws the sides together and folds the support means and seat.

4,026,569

WHEEL ASSEMBLY FOR A CONTAINER OR SUITCASE

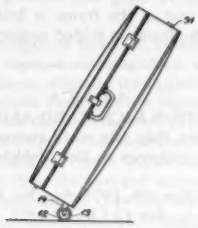
Anne-Kathrine Staal, Kollemosevej 29 B, DK-2840 Holte, Denmark

Filed Nov. 19, 1975, Ser. No. 633,299

Claims priority, application United Kingdom, Nov. 25, 1974, 50889/74

Int. Cl.² B62B *1/04*

U.S. Cl. 280—43 **2 Claims**



1. A wheel assembly for a container or suitcase comprising in combination:

a wheel casing having an open end and being adapted to be secured in the container or suitcase,

a wheel fork carrying a rotatably mounted wheel and having an end portion defining a square,

a wheel fork supporting block in which said wheel for is rotatably mounted,

means including a pin-and-slot connection for mounting said supporting block in said wheel casing in such a manner that the supporting block is displaceable between an inner and an outer position.

blocking means engageable with said supporting block in the inner position thereof to prevent pivotal movement of said block,

means adjacent to and within the open end of said wheel casing, defining a square recess for receiving said end portion of said wheel fork, and

a tension spring tensioned between points of said wheel casing and said supporting block respectively, which points are so located that in all positions of the supporting block said tension spring tends to draw said wheel into the wheel casing.

4,026,570

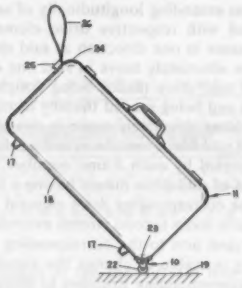
CASTER FOR LUGGAGE

Irving Feinberg, Saddle Brook, N.J., assignor to Presto Lock Company, Division of Walter Kidde & Company, Inc., Elmwood Park, N.J.

Filed Sept. 29, 1975, Ser. No. 617,512

Int. Cl.² B62B *1/04*

U.S. Cl. 280—47.17 **10 Claims**



1. A mounting plate assembly to which another assembly can be connected comprising:

a support plate having inner and outer surfaces, and flange means for attachment to a luggage case so that the inner surface of the support plate faces the case;

the support plate having a first aperture for receiving a notched tab on the other assembly when the latter is connected to the outer surface of the support plate;

the support plate having a second aperture for receiving a second tab on said other assembly;

resilient means including a latch member positioned in operative relationship to the inner surface of the support plate and resiliently urged to an operative position overlying said first aperture for engaging the notched tab and releasably retaining the other assembly to the support plate; and

manually operable means on the latch member for manually displacing the same against the action of the resilient means from the operative position to an inoperative position out of overlying relationship with said first aperture for disengaging the notched tab and releasing the other assembly from the support plate.

4,026,571

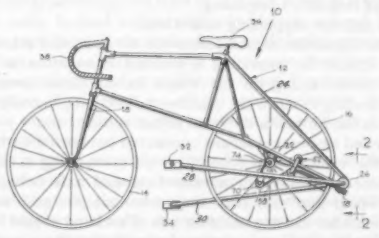
BICYCLE WITH REAR MOUNTED CRANK ARMS AND IMPROVED CHAIN CONTROL UNIT

Franciscus A. Vereyken, 4321 Norwalk Drive No. 206, San Jose, Calif. 95129

Filed Apr. 16, 1975, Ser. No. 567,321

Int. Cl.² B62M *1/04*

U.S. Cl. 280—251 **17 Claims**



1. In a bicycle of the type having a frame provided with a pair of spaced, elongated frame members disposed alongside and extending to a location behind a wheel having a hub mounted on and disposed between the frame members, a drive

control unit comprising: a pair of crank arms; means coupled with the crank arms for mounting the same on said frame members at the rear ends of the latter for up and down movement along respective paths with the crank arms extending longitudinally of the frame members, alongside the wheel and forwardly of the wheel hub; an elongated, flexible drive means; a pair of drive elements carried on said wheel hub at the opposite sides thereof, said drive means having a pair of side portions extending longitudinally of said frame members and coupled with respective drive elements to alternately rotate the same in one direction as said side portions of said drive means alternately move in said one direction, said side portions of said drive means being coupled with respective crank arms and being moved thereby in said one direction as said crank arms alternately move in one sense relative to the rear ends of said frame members; and a follower adapted to be shiftably carried by each frame member, respectively, each side portion of said drive means having a first stretch extending from the corresponding drive element to the corresponding crank arm and a second stretch extending from the corresponding crank arm to the corresponding follower, each follower being operable to change the angular relationship between the corresponding stretches to thereby effect a change in the torque applied to the hub as a function of the movement of the corresponding crank arm in said one sense.

4,026,572

MEANS FOR ISOLATING A VIBRATION OR SHOCK

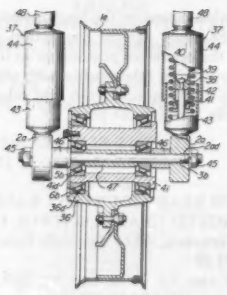
Koji Yoshioka, 1858, Shuntokucho-1-chome, Higashiosaka, Japan

Continuation of Ser. No. 449,886, March 11, 1974, abandoned. This application July 3, 1975, Ser. No. 593,360

Claims priority, application Japan, Feb. 17, 1970, 45-13714; Mar. 31, 1970, 45-27272; Oct. 5, 1970, 45-87640

Int. Cl.² B62K *25/06*

U.S. Cl. 280—276 **5 Claims**



1. A suspension for a vehicle wheel, said wheel having a first axis of rotation, comprising:

an axle for supporting said wheel,

first suspension means connected between said axle and the vehicle for providing a resilient connection to absorb shocks acting on the wheel having force components tending to move the wheel in a direction generally normal to the direction of travel of the vehicle; and

second suspension means connected between the wheel and the vehicle, said second means comprising at least one eccentric member mounted on said axle between said wheel and said first suspension means, said eccentric member causing said first axis of rotation of said wheel to move along an arc of a circle relative to a second axis fixed relative to said fist suspension means in response to generally horizontal forces acting transverse to said axis of rotation of said wheel, thereby providing a resilient connection to absorb shocks acting on the wheel having force components tending to move the wheel in a direction generally parallel to the direction of travel of the vehicle.

4,026,573

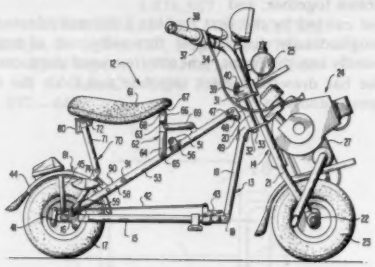
FOLDABLE MOTOR SCOOTER

Orland W. Richardson, Columbus, Ohio, assignor to Joseph Skilken & Co., Columbus, Ohio

Filed Apr. 21, 1976, Ser. No. 678,918

Int. Cl.² B62K *15/00*

U.S. Cl. 280—278 **10 Claims**



1. In a portable foldable vehicle, in combination, a chassis and a steering column, said chassis comprising a substantially triangular frame having top, front and bottom leg portions pivotally connected at the corners of the frame, substantially vertical pivot means connecting said steering column to the upper front corner of the frame, one of said leg portions having intermediate hinge means allowing the frame to be folded, releasable means normally locking said hinge means and being releasable at times to permit folding of said frames, a driver's seat, means normally supporting said seat on the frame in a position elevated above said top leg portion, means to lower said seat toward the frame responsive to folding of the frame, means to bring said steering column over and adjacent to the seat as the frame is folded, and means to releasably lock the frame in folded position.

4,026,574

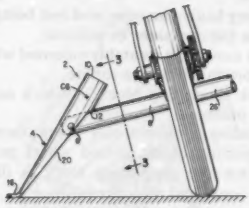
COMBINATION KICKSTAND AND FOOTREST

Anthony C. Bonora, Palo Alto, and Lawrence L. Ray, San Jose, both of Calif., assignors to Bolt Vehicles, Inc., Sunnyvale, Calif.

Filed Nov. 19, 1975, Ser. No. 633,588

Int. Cl.² B62H *1/02*

U.S. Cl. 280—295 **2 Claims**



1. A combination kickstand and footrest apparatus for a two-wheeled vehicle having a park position and a footrest position comprising:

a first elongated horizontal member rigidly mounted on said vehicle with its longitudinal axis substantially transverse to the longitudinal axis of the vehicle, and

a second elongated member rotatably mounted on said first member with the axis of rotation between said members

substantially parallel to the longitudinal axis of said vehicle, a length of said second member on one side of said axis being adapted to support the foot of the operator of the vehicle and the end of said second member on the opposite side of said axis of rotation adapted to engage the ground to support said vehicle in a substantially upright position, the center of gravity of said member being intermediate said axis of rotation and the end on said one side whereby said end on said one side is urged downward toward said first member when said apparatus is in said park position and said end on said other side is urged upward toward said first member when said apparatus is in said footrest position, said second member being elongated and hollow throughout at least a portion of its length and having an opening in its wall adapted to receive said first member with said second member partially encompassing said first member and the longitudinal axis of said second member substantially parallel to the longitudinal axis of said first member and in pressing engagement therewith when said apparatus is in the footrest position.

4,026,575

PLASTIC SKI

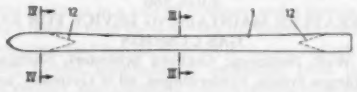
Peter Rudolf Hartwig, Hilchenbach, Germany, assignor to Schloemann-Siemag Aktiengesellschaft, Dusseldorf, Germany

Filed Dec. 8, 1975, Ser. No. 638,536

Claims priority, application Germany, Dec. 24, 1974, 2461461

Int. Cl.² A63C *5/07*

U.S. Cl. 280—610 **4 Claims**



1. Plastic ski of compound structure, consisting of a running surface with steel edges, a carrying strap, a carrying upper strap and a cover layer, whereby the upper and lower straps are connected by plastic foam which is injected into the core, characterized by the fact that the core (5) has at least three sections over its length and at least two different densities of plastic foam and the center section of the core (5) has a lower density than the two end sections, and that the individual sections of the core (5) are connected with each other by an obstruction (12) made of fiber glass.

4,026,576

SELF RESTORING RELEASABLE SKI BINDING

Jean-Paul Frechin, Chamonix, France, assignor to Garcia Corporation, Teaneck, N.J.

Filed May 22, 1975, Ser. No. 579,933

Claims priority, application France, May 31, 1974, 74.19127

Int. Cl.² A63C *9/08*

U.S. Cl. 280—613 **2 Claims**

1. A ski binding having release and return capabilities comprising:

a hollow sole plate of substantially uniform thickness;

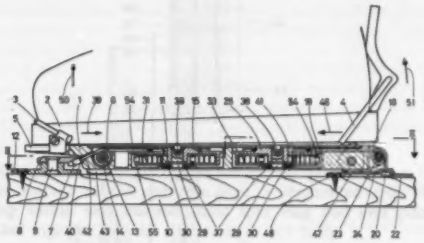
gripping means mounted to said sole plate for holding the sole of a ski boot thereon;

front and rear winders housed within said sole plate, said winders being elastically biased by string means;

a front cable and a rear cable, said front cable having one end connected to said front winder and the other end extending from the front of said sole plate, said rear cable having one end connected to said rear winder and the other end extending from the rear of said sole plate, each of said cables being tensioned by said respective winders;

a front engagement means constructed and arranged to secure the extending end of said front cable to a ski whereby the front of said sole plate is urged forwardly thereagainst by said front cable;

a rear engagement means constructed and arranged to secure the extending end of said rear cable to said ski whereby the rear of said sole plate is urged downwardly thereagainst by said rear cable; and



guide means arranged at the rear of said sole plate over which said cable passes whereby the traction exerted by said cable upon said rear engagement means is normally substantially perpendicular to said ski.

4,026,577

SELF-RESTORING SKI BINDING HAVING SINGLE TENSIONING MEANS

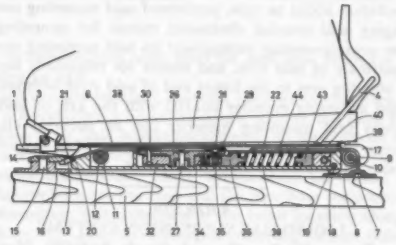
Jean-Paul Frechin, Chamonix, France, assignor to Garcia Corporation, Teaneck, N.J.

Filed June 6, 1975, Ser. No. 584,403

Claims priority, application France, June 14, 1974, 74.20825

Int. Cl.² A63C *9/08*

U.S. Cl. 280—613 **6 Claims**



1. In a releasable ski binding comprising a sole plate, means for releasably securing a ski boot to said sole plate, at least one flexible cable housed within said sole plate to extend from opposite ends thereof, the ends of said cable being secured to the surface of ski to permit release of said sole plate from said ski upon application of a minimum release force and automatic return of said plate to said ski upon abatement of said force, an improved means for continuously tensioning said cable comprising:

a single support rotatably mounted within said sole plate;

a pair of cable engaging elements mounted to said support in substantially the same plane and in diametric positions, said support and cable engaging elements being rotatable between a first position wherein the length of said cable is reduced and a second position wherein the length of said cable is increased; and

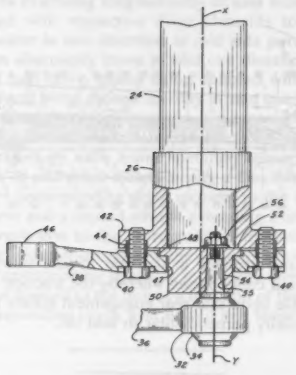
biasing means housed within said sole plate and arranged to continuously urge said rotatable support into said first position.

4,026,578

VEHICULAR WHEEL ADJUSTING DEVICE

Charles T. Mattson, 5184 Sonoma Highway, Santa Rosa, Calif. 95405

Filed Apr. 7, 1976, Ser. No. 674,564
Int. Cl.² B62D 17/00
U.S. Cl. 280—661 3 Claims



1. A device for adjusting the alignment of a wheel carried on a vehicle including a frame, a strut, means mounting the upper end of said strut on said frame, means mounting said wheel on the lower end of said strut, a lower ball joint having upper and lower complementary components, means for mounting said lower complementary component on said frame, and means for initiating selective steering of said wheel, said device comprising: a steering arm; means adapted to connect on endof said steering arm to said selective steering initiating means; a circular bearing opening in the other end of said steering arm; means forming an internal abutment in said bearing opening; a circular mounting member received in said bearing opening for rotation about an axis, portionsof said mounting member engaging said internal abutment; means for mounting said upper complementary component on said mounting member eccentricaly of said axis; and means for releasably securing said steering arm to the lower end of said strut with said axis of said mounting member coaxial with the axis of said strut whereby said mounting member can be securely clamped between said strut and said internal abutment in any one of a plurality of rotatably adjusted positions.

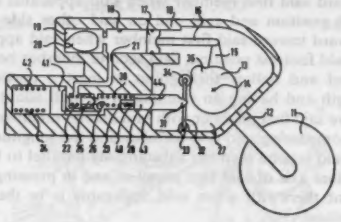
4,026,579

LIQUID/GAS SUSPENSION SYSTEMS

Brian Foster, Kenilworth, and Frank Radcliffe Mortimer, Coventry, both of England, assignors to Dunlop Limited, London, England

Filed June 5, 1975, Ser. No. 584,119
Claims priority, application United Kingdom, June 6, 1974, 25165/74
Int. Cl.² B60G 11/26
U.S. Cl. 280—705 5 Claims

1. A liquid/gas suspension system for a vehicle comprising a liquid chamber, a gas spring located in the liquid chamber, a cylinder communicating with the liquid chamber, a main piston reciprocable in the cylinder to pressurize liquid in the chamber, the chamber and cylinder being fixed relative to the vehicle chassis, linkage means connecting the main piston to a member movable with a road wheel of the vehicle relative to the chassis so that the main piston is reciprocable in the cylinder in response to relative movement of said member and the chassis caused by the vehicle travelling over an uneven terrain, an auxiliary cylinder communicable with the liquid chamber and fixed relative to the chassis, a non-return valve interposed between the auxiliary cylinder and the liquid chamber biassed to prevent, in its closed position, the flow of liquid from the liquid chamber to the auxiliary chamber, a pump element reciprocable in the auxiliary cylinder, the pump element being adapted to admit liquid to the auxiliary cylinder during an initial portion of its stroke and to pressurize the liquid in the auxiliary cylinder during a latter part of its stroke, and linkage means interconnecting the pump element and a member movable with a road wheel of the vehicle whereby the



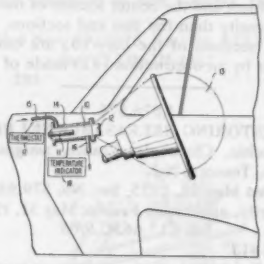
pump element is caused to reciprocate in the auxiliary cylinder in response to relative movements between said member and the chassis caused by the vehicle moving over an uneven terrain whereby liquid is admitted to and pressurized in the auxiliary cylinder, and is admitted to the liquid chamber if there is a predetermined pressure differential between the auxiliary cylinder and the liquid chamber which unseats the non-return valve.

4,026,580

TEMPERATURE MAINTAINING DEVICE FOR SAFETY GAS CUSHION

Helmut Wulf, Nellingen; Gerhard Schiesterl, Stuttgart, and Hansjürgen Scholz, Echterdingen, all of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany

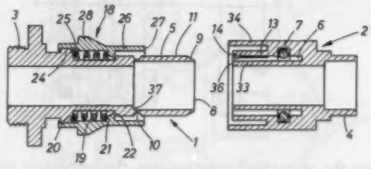
Filed Nov. 1, 1971, Ser. No. 194,355
Claims priority, application Germany, Nov. 2, 1970, 2053773
Int. Cl.² B60R 21/08
U.S. Cl. 280—736 20 Claims



1. A safety device for the protection of a vehicle occupant, comprising: an inflatable cushion means, a compressed gas source means, means for automatically communicating said gas source means with said cushion means for inflation thereof in response to a vehicle exceeding a predetermined deceleration, means for maintaining said gas source means at a predetermined temperature, said maintaining means including heating means operative for heating said gas source means, and control means for controlling the heating means in dependence upon the temperature of said gas source means, said control means rendering said heating means operative when the temperature of said gas source means is below said predetermined temperature and rendering said heating means inop-

erative when the temperature of said gas source means reaches approximately said predetermined temperature.

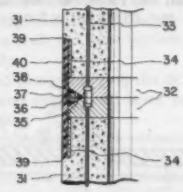
4,026,581
RELEASABLE COUPLING
Max Pasbrig, Orselina, Switzerland, assignor to Lacrex Brevetti S.A., Minusio, Switzerland
Filed Nov. 13, 1975, Ser. No. 631,665
Int. Cl.² F16L *37/12*
U.S. Cl. 285—24 **3 Claims**



1. Releasable coupling device comprising cooperating male and female members for sealingly containing fluids therein, a male member with an insert extension having a peripheral surface including a peripheral groove for releasably engaging clamping fingers; a retaining sleeve axially displaceable upon said male member and behind said peripheral groove as viewed from the front edge of said insert extension, said retaining sleeve being slidable against a spring pressure, said retaining sleeve including a sleeve jacket disposed at a predetermined spacing from said peripheral surface of said insert extension, said sleeve jacket covering said peripheral groove when the jacket is in a locked position; and a female member forming a socket bush for receiving the insert extension of the male member, said female member including radially resilient clamping fingers longitudinally extending from the inside surface thereof, said clamping fingers having clamping bosses adapted to engage the peripheral groove of said insert extension, a guide pipe spaced from the inside of said female member clamping fingers by the thickness of wall of said insert extension, said guide pipe extends with its free end at least as far as the bosses of the clamping fingers, said guide pipe outside surface engages and surrounds the inside surface of the insert extension of said male member when the male member is in a connected relationship with the female member to form an elongated tortuous path for sealing purposes, a sealing ring positioned rearwardly from said clamping bosses for sealing the terminal external end portion of said male member insert extension, said sealing ring being positioned at the end of said tortuous path whereby internal fluid seeking to escape must enter the transverse passageway between the male and female members, traverse the longitudinally extending, engaging surfaces defined by the guide pipe and the insert and reverse direction before contacting the sealing ring, and whereby said guide pipe centers said insert extension as it is inserted into said female member, protects said sealing ring from damage during the insertion, and reinforces the coupling device.

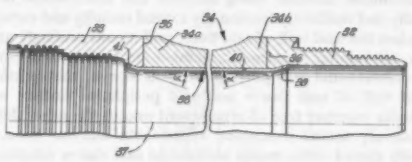
4,026,582
CONNECTED PART OF CONCRETE PIPE
Nobuyuki Abe, Tokyo; Ikuo Yanashima, Kamakura, and Kenjiro Ohiwa, Urawa, all of Japan, assignors to Nippon Concrete Industries Co. Ltd., Tokyo, Japan
Filed Aug. 11, 1975, Ser. No. 603,646
Int. Cl.² F16L *11/12*
U.S. Cl. 285—45 **9 Claims**

1. Means for connecting sections of reinforced concrete pipe, each section having longitudinally extending reinforcing members concentrically disposed and embedded within the pipe wall and having means to fixedly attach said reinforcing members to end plates, said end plates having an inner diameter equal to the inner diameter of said pipe and having mating surfaces extending from the interior to a central portion of the pipe wall and thereafter diverging to form an annular channel, said channel comprising a bevel groove the depth of which is



about equal to the depth of said reinforcing members from the outer surface of the concrete pipe, a segmented split ring fitting within said channel, said split ring and end plates welded together in axial alignment as one body.

4,026,583
STAINLESS STEEL LINER IN OIL WELL PIPE
Theodore Gottlieb, Los Angeles, Calif., assignor to Hydril Company, Los Angeles, Calif.
Filed Apr. 28, 1975, Ser. No. 572,079
Int. Cl.² F16L *9/14;* **E21B** *17/08*
U.S. Cl. 285—55 **5 Claims**



1. In combination with steel oil well pipe having a bore defining an axis

a. a corrosion-resistant, metallic liner within the pipe, and

b. a metallurgical bond intimately joining the liner to the pipe bore, said bond characterized by an intimate intermolecular diffusion connection extending circumferentially continuously along substantially the entire axial length between the liner and the pipe bore for preventing formation and collection at the bond location along the bore of gaseous hydrogen resulting from diffusion through the bond of atomic hydrogen,

c. the major length of the pipe consisting of steel which is relatively non-corrosion resistant, and the pipe also including an annular end portion the surface of which is corrosion resistant, said end portion being threaded and having a bore, said liner bonded to the bore of the pipe major length and also to annular bore extent of said pipe end portion, said end portion welded endwise to said major length of the pipe at an annular joint therebetween, said liner bridging said joint, said annular bore extent being axially tapered between 4° and 15° relative to the bore axis,

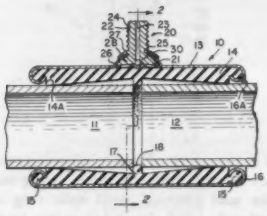
d. said annular bore extent located between said joint and an interior zone of the pipe end portion radially inwardly of said threading, the liner and said axial bore extent terminating proximate said joint, the joint extending substantially radially between the liner and the outer surface of said end portion,

e. said liner comprising a corrosion resistant steel cylinder and a metallic film on the cylinder outer surface, the bond formed between said film and the pipe bore.

4,026,584
COUPLING FOR CONDUITS

Grayson Lowe, 2900 Long Lake Road, Lapeer, Mich. 48446

Filed Oct. 16, 1975, Ser. No. 623,260
Int. Cl.² F16L 17/00
U.S. Cl. 285—96 9 Claims



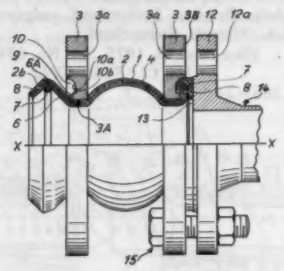
1. A device for coupling end portions of two substantially axially aligned conduits having preselected essentially identical outer diameters with respect to said end portions and wherein said end portions are sealing encompassed by said device, comprising a sleeve, said sleeve having a bore therethrough, said bore having an axially inwardly facing cylindrical wall, a tubular elastomeric member positioned internally in said bore, said tubular elastomeric member having an internal diameter along its substantial length greater than the external diameter of said end portions of said preselected conduits, said tubular elastomeric member having a periphery with an outer diameter whereby its peripheral surface lies in intimate confrontation with the said wall of said bore, said tubular elastomeric member being adapted and constructed to normally and resiliently tensionally extend radially and outwardly against the said wall of said bore, and means sealingly attaching said tubular elastomeric member circumferentially only to circumferential end portions of said sleeve, that portion of said wall of said sleeve and said peripheral surface of the tubular member free of attachment one to the other define a relatively sealed evacuated expandable annular zone, normally closed valve means secured to said sleeve adapted and constructed to provide communication through said sleeve into said zone when said valve means is in an open condition for the introduction of pressurized fluid to expand said zone thereby urging tensionally, inwardly and radially a substantial portion of said elastomeric member thereby effecting sealing engagement of said tubular elastomeric member against the respective end portions of said axially aligned conduits, said valve when in a closed condition retaining said introduced fluid within said zone to maintain said engagement, when said valve is in an open condition, said tubular elastomeric member expels said pressurized fluid when in a fluid condition through said valve to thereby assume its normal condition.

4,026,585
FLEXIBLE PIPE COUPLING

Hans Berghöfer, Alte Landstr. 274, Hamburg, Germany

Filed Aug. 1, 1975, Ser. No. 601,164
Claims priority, application Germany, July 14, 1975, 2531349; Aug. 2, 1974, 2437240
Int. Cl.² F16L 51/02
U.S. Cl. 285—229 22 Claims

1. A flexible coupling for interconnecting two axially spaced-apart pipe ends, said coupling comprising an axially tubular elastic hose having a median section forming a bellows, two outer sections axially flanking said bellows and flaring outwardly therefrom in unmounted condition of said hose, and two collars axially flanking said outer sections and tapering inwardly therefrom in unmounted condition of said hose, said collars each forming with the respective outer section a radially inwardly opening seat; a support ring in each of said seats; two annular connecting members each having an end face turned axially away from said bellows and engaging a respective outer section, each end face having an annular axially opening groove axially alignable with the respective support ring; and fastening means for securing each of said connecting members to a respective pipe end face bearing

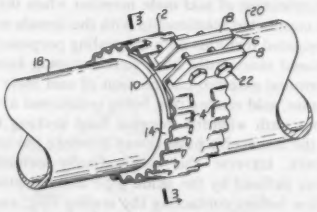


axially on the respective outer section, the respective pipe end bearing axially on the respective collar, and the respective support ring at least partially received with a portion of the respective outer section in the respective groove.

4,026,586
PLAIN END PIPE JOINT

Harold Kennedy, Jr., and Robert M. Graham, both of Birmingham, Ala., assignors to United States Pipe and Foundry Company, Birmingham, Ala.

Filed Mar. 15, 1976, Ser. No. 666,629
Int. Cl.² F16L 21/06
U.S. Cl. 285—236 1 Claim



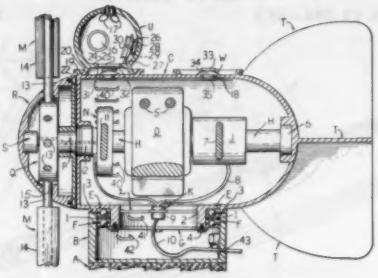
1. A coupling for joining two plain ended pipe sections in end-to-end alignment including a resilient sleeve seal member surrounding and engaging the ends of said pipe sections, an elongated metal strip with two end portions and two edge portions and surrounding and engaging a major portion of said resilient sleeve seal member, the end portions of said elongated metal strip being bent to protrude radially away from said pipe sections; and said end portions being spaced circumferentially apart; and clamp means for urging said end portions closer together and compressing said resilient sleeve seal member into sealing engagement with said pipe ends, the improvement which comprises; said elongated metal strip having successive corrugations extending axially across each edge portion for about one-third of the width thereof to a flat central portion and said successive corrugations being spaced apart from a point near one end to a point near the other end of said elongated metal strip whereby said edge portions will under a given load deform more than said flat central portion.

4,026,587

UNDERWATER TURBINE OPERATED BY OCEAN CURRENTS

Robert H. Hultman, 42748 Newport Drive, Fremont, Calif. 94538, and Dennis C. Hultman, 11035 Early Dawn Road, Turlock, Calif. 95380

Filed Apr. 24, 1975, Ser. No. 571,367
Int. Cl.² F03B *13/10*
U.S. Cl. 290—53 **4 Claims**



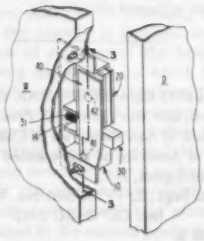
1. In combination:
a. a base adapted to be submerged in an ocean current and rest on the ocean floor;
b. an elongated housing swingably mounted on said base and being free to swing through a circle of 360° about a vertical axis;
c. an electric generator mounted in said housing, the interior of the housing being large enough for a person to enter for inspecting said generator, said housing having an opening large enough for a person to enter, and a removable cover for the opening;
d. a propeller rotatably mounted at the front end of said housing and fins mounted at the other end, whereby the prevailing ocean current will strike said fins for swinging said housing so that said propeller will continually face the ocean current;
e. means operatively connecting said propeller to said generator; and
f. an electric cable electrically connected to said generator and extending to the ocean surface for conveying the electric current from the generator.

4,026,588

PUSH-TO-OPEN MAGNETIC CATCH

Robert H. Bisbing, Springfield, and James H. Vickers, Media, both of Pa., assignors to Southco, Inc., Concordville, Pa.

Filed June 15, 1976, Ser. No. 696,180
Int. Cl.² E05C *19/16*
U.S. Cl. 292—251.5 **11 Claims**



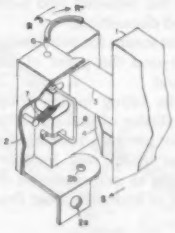
1. A push-to-open magnetic catch for a cabinet door or the like, said catch comprising:
a. a housing;
b. a lever supported at one end for pivotal movement within said housing;
c. a magnet pivotally mounted on said lever at the other end thereof and adapted to be guided by said housing to be aligned to mate with the door surface when said lever is moved pivotally;
d. a spring-loaded plunger urging the door in a door-opening direction and urging said lever pivotally in a door-opening direction;
e. stop means for limiting the movement of said plunger in said door-opening direction whereby when said plunger is in said limit position said lever holds said magnet in a door-latching position and said plunger projects beyond said housing to a position to be engaged during door closing;
f. lever pivot-support means providing a frictional drag to the movement of said lever-mounted magnet for retaining said magnet in a preselected position during door closing and door opening, said means comprising:
i. a pivot stud on said lever;
ii. a boss in said housing having a bore for receiving said stud with an interference fit; and
g. means limiting the forward movement of said magnet.

4,026,589

DOOR LOCKING MECHANISM

Leland J. Hanchett, Jr., 211 Ridge St., Winchester, Mass. 01890

Filed June 4, 1976, Ser. No. 692,833
Int. Cl.² E05C *3/14*
U.S. Cl. 292—341.16 **7 Claims**



1. A door locking mechanism including
a. a strike case adapted to receive a dead bolt;
b. a pivotable keeper for selectively opening and closing said strike case;
c. bistable spring means acting on said keeper to maintain said keeper either in the fully open position or in the fully closed position thereof, said bistable spring means maintaining said keeper in said fully open position if the keeper is moved to its fully open position by the extended dead bolt;
d. an abutment projecting from said keeper and cooperating with said dead bolt to cause said bistable spring means to return said keeper to said fully closed position thereof if said dead bolt engages said abutment; and
e. a latch bolt for maintaining said keeper in said fully closed position thereof when said bistable spring means has moved said keeper in closing direction.

4,026,590

FOLDING BUMPER ARRANGEMENT

Alan F. Holm, 1809 Sixth St., White Bear Lake, Minn. 55110

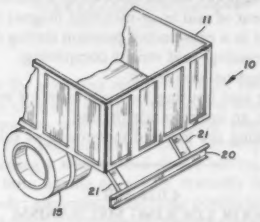
Filed June 14, 1976, Ser. No. 695,418
Int. Cl.² B60R *19/02*
U.S. Cl. 293—73 **4 Claims**

1. Retractable rear bumper means for attachment to the rear of self-propelled dump trucks having boxes which over-

hang the rear axles and extend rearwardly thereof with the retractable bumper means being coupled to the frame of said dump truck box and arranged to be disposed in normal stable disposition resistant to forward motion upon application of force from the rear thereof and being arranged to fold upwardly upon initiation of the raising of the dump truck box to a raised dumping position; said bumper means comprising:

a. bumper bar means arranged to extend generally transversely across the rear of a dump truck and having a length which exceeds the inner tread width span of the rear wheels of said truck;

b. linkage means arranged to retain said bumper bar in said normal stable disposition and to raise said bumper bar in response to the initiation of raising of said dump truck box, said linkage means comprising:



1. a pair of laterally disposed first arms secured to said bumper bar at the lower ends thereof and being pivotally coupled to said dump truck box frame along the base of said box and generally between the rear axle on the rear of said dump truck box for pivoting of said bumper bar between said normal disposition and said retracted disposition;

2. abutment means for restraining the pivoting of said first arms beyond the point of said stable normal disposition; and

3. hydraulic lifting means coupled in circuit with the lifting cylinder of said dump truck box and having ram means for pivotally rocking said first arms in an arcuate direction to lift said bumper bar from said normal disposition to said retracted disposition in response to the flow of hydraulic fluid from said lifting cylinder.

4,026,591

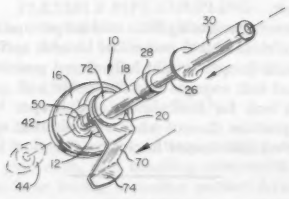
CONTACT LENS HANDLING TOOLS

John A. Cleaveland, Rte. 1, Box 61, Portland, Oreg. 97231

Filed Mar. 15, 1976, Ser. No. 667,268

Int. Cl.² A61F *9/00*

U.S. Cl. 294—1 CA **15 Claims**



12. An improved contact lens handling tool comprising:

an elongated, flexible tubular bellows means having lens-holding means on an end thereof,

the bellows means comprising an elastomer tube having a plurality of convolutions and being flexible both laterally and axially so that a lens may be moved gently to the eye,

the bellows means having a manually closable opening at the opposite end thereof adapted to be closed by the user.

4,026,592

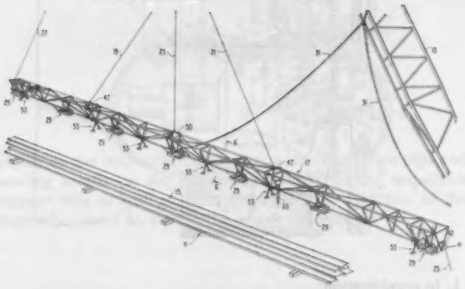
ELECTROMAGNETIC LIFTING AND HANDLING DEVICE

Joseph T. Powers, Quaker Hill, Conn., assignor to Morrison-Knudsen Company, New London, Conn.

Filed Nov. 14, 1975, Ser. No. 632,077

Int. Cl.² B66C *1/04*

U.S. Cl. 294—65.5 **25 Claims**



1. A device for supporting a long flexible sheet metal pile while moving the pile from a horizontal storage position to an upright position for interlocking connection with an adjacent driven pile, the device when considered as resting on the ground comprising

a. an elongated rigid, open framework of polygonal cross section formed of a plurality of longitudinal structural members extending the length of the framework and bracing members joined to the longitudinal structural members and extending transversely thereto,

b. a plurality of electromagnetic means carried by the framework along the lowermost side of the framework,

c. a pile engaging surface on each electromagnetic means facing downwardly,

d. pivotal support means between each electromagnetic means and the framework for supporting the electromagnetic means with the pile engaging surface movable into surface engagement with the surface of a pile for optimum magnetic holding effect, the pivotal support means holding each electromagnet for limited movement around an axis parallel to the longitudinal axis of the framework and against appreciable rotational movement in a plane normal to a vertical axis through the center of the electromagnetic means,

e. means disposed at points spaced along the length of the framework and carried by the upper members of the framework for attachment of lifting cables, and

f. means carried by one end of the framework for suspending the framework and a pile held by the framework with the pile disposed as near as practicable to a desired upright position for movement into interlocking engagement with an adjacent driven pile.

4,026,593

QUICK FIND GRABBER-MINE RECOVERY

Wallace E. Brown, Del Mar; James G. Proctor, and William H. Armstrong, both of San Diego, all of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 2, 1976, Ser. No. 720,036

Int. Cl.² B66C *1/42*

U.S. Cl. 294—66 R **8 Claims**

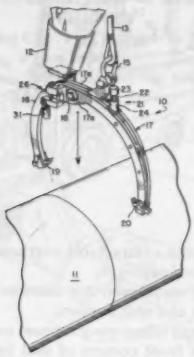
1. In an apparatus actuated by a marine mammal for connecting a line to a submerged object and having a pair of ice tong-like arcuate members journaled together for relative

converging pivotal motion, an improvement therefor is provided comprising:

means shaped to fit on the head of the marine mammal and being carried thereon for aligning the arcuate members with the object;

means mounted between first end portions of the pair of ice tong-like arcuate members for biasing their second opposite end portions in a pivotally converging direction;

means carried on the first end portion of one of the ice tong-like arcuate members disposed in a substantially lateral alignment with the arcuate members for retaining



the second opposite end portions of the ice tong-like arcuate members from pivotally converging motion;

means mounted in a substantially lateral alignment with the arcuate members and retaining means for releasing the retaining means to allow the pivotally converging motion about the object;

means carried on the second opposite portions of the pair of ice tong-like arcuate members for penetratingly engaging the object; and

means coupling the line to only one first end portion of one of the ice tong-like arcuate members to ensure penetrating engagement with the object.

4,026,594

CONNECTING DEVICE

Kauko Kumpulainen, Hushagsgatan 13 H, 781 02 Borlange, Sweden

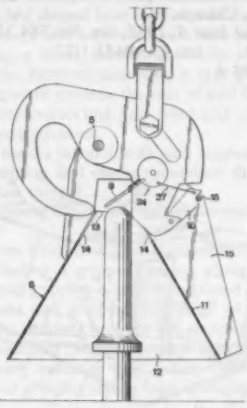
Filed Mar. 4, 1976, Ser. No. 663,698

Claims priority, application Sweden, Mar. 14, 1975, 7502876

Int. Cl.² B66C *1/38*

U.S. Cl. 294—83 R **12 Claims**

1. In a device for connecting and disconnecting a lifting or drawing hook having an axis of rotation to and from a couple, the hook having a free end portion and a passage for the couple located close to the free end portion and being rotatable between a first position for releasing and receiving the couple, in which the passage is directed in a first direction relative to the axis of rotation of the hook, and a second position for grabbing the couple, in which the passage is directed in a second direction diverging from the first direction, the improvement comprising a chain means or the like carrying said hook; an operating means including a member located at the passage; locking means controllably coupled to said operating means and movable from a locking position by said operating means in response to entry of the couple through the passage and into contact with said member for allowing the hook to be rotated to the second position in which it grabs the couple and constitutes the sole force-transmitting element between the chain means and the couple, said locking means being movable to the locking position upon rotation of the hook to a position for releasing said couple out of engagement with said hook and into the first position and for placing said



locking means in the locking position with the passage directed in the first direction relative to the axis of rotation.

4,026,595

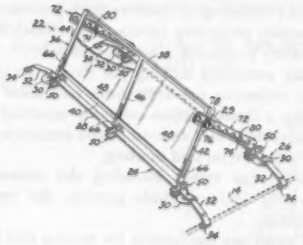
AIR CURRENT DEFLECTOR FOR A TOWED TRAILER

George J. Jacks, 342 Wrights Lane, Exton, Pa. 19341

Filed Mar. 24, 1976, Ser. No. 670,511

Int. Cl.² B62D *37/02*

U.S. Cl. 296—1 S **4 Claims**



1. In combination with a vehicle towing a trailer, said vehicle having a roof and having a roof-top carrier means including forward and rearward generally horizontal rails extending transversely of said roof intermediate its length in parallel spaced relation, the improvement comprising:

an elongated panel means disposed above and transversely of said roof,

said panel means having a face surface extending between a depending forwardly disposed leading edge and trailing edge disposed above and rearwardly of the leading edge so that the face surface deflects air currents passing over the roof in an upward direction;

first and second clamp means disposed near each end of said forward and rearward carrier rails, respectively, each clamp means including an upper and lower clamp strip transversely disposed respectively on the upper and lower surfaces of the respective carrier rail,

bolts and thumb screws joining the respective adjacent ends of said clamp strips,

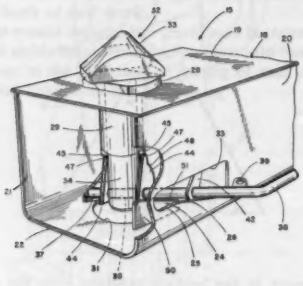
a pivot axis forming horizontal member having legs secured to each respective said upper clamp strip; and,

bar means pivotally connecting the leading and trailing edge portions of said panel means with the respective horizontal member on said clamp means.

4,026,596
CONTAINER HOLD DOWN LOCKING MEANS

George W. Carr, Albuquerque, N. Mex., assignor to Pullman Incorporated, Chicago, Ill.

Filed June 5, 1975, Ser. No. 584,236
Int. Cl.[2] B65J 1/22
U.S. Cl. 296—35 A 10 Claims



1. In a highway trailer including a chassis having a plurality of cross members, a plurality of coupling assemblies located on lateral portions of the cross members, with each coupling assembly including;

a locking housing, including a top wall and vertical wall means,

said top wall including an aperture having mounted therein, an upwardly projecting tubular shear block including a downwardly projecting tubular extension,

a vertically extending locking pin having an upper head portion projecting upwardly from said shear block and including a shank portion rotatably mounted and vertically movable in said extension, said extension projecting downwardly within said housing,

said vertical wall means including slot means having a downwardly inclined guide portion, the improvement comprising;

a manual operating mechanism for moving said locking pin and head between lock and unlock positions and for varying the positioning of said head to accommodate the different vertical thickness of bases of trailer corner castings, including,

rod means connected to said shank portion of said pin to rotate relative thereto about a horizontal axis,

said rod means including a portion projecting outwardly from said slot and including a handle,

said rod means portion being movable from an unlock position downwardly on said inclined portion whereby said shank portion is rotated about a vertical axis and said head is moved to a lock position relative to the base of a corner casting,

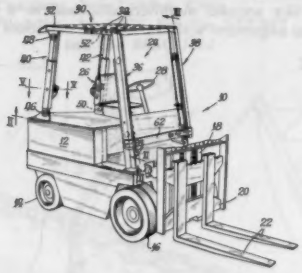
first stop means connected to and rotatable with said rod means adapted to engage engageable means on said extension during rotation of said rod means to one position for limiting the vertical position of said head to accommodate a certain vertical thickness base of a corner casting in said locked position, and

said rod means including second stop means on said rod and means rotatable therewith and engageable with engageable means on said extension when said rod means is rotated to a second position to accommodate a different vertical thickness of another corner casting base.

4,026,597
COLLAPSIBLE OVERHEAD GUARD

Robert Henry Miller, Cleveland, and John Paul Yost, Willoughby, both of Ohio, assignors to Towmotor Corporation, Mentor, Ohio

Filed Dec. 22, 1975, Ser. No. 643,413
Int. Cl.[2] B60J 7/24
U.S. Cl. 296—107 8 Claims



1. In combination a retractable overhead guard with a vehicle, said guard comprising:

a substantially rectangular top member defining,

a pair of front and rear corners,

a pair of forward telescoping support members rigidly fixed to both side front corners of said top member and said vehicle,

a pair of rear telescoping support members,

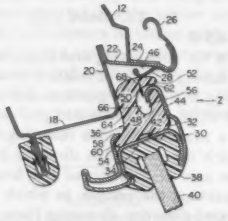
means pivotally connecting said rear telescoping support members to said rear corners of said top member and said vehicle, and

locking means on said guard for retaining said telescoping support members in a selective plurality of positions so that said vehicle is capable of operating in areas where low overhead clearance is a requirement.

4,026,598
WEATHER STRIP FOR MOTOR VEHICLE DOOR AND SEAL CONSTRUCTION

Syouichi Koike, Tokyo, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Nov. 14, 1975, Ser. No. 632,106
Claims priority, application Japan, Nov. 16, 1974, 49-138986[U]
Int. Cl.[2] B60J 1/00; E06B 7/16
U.S. Cl. 296—146 11 Claims



1. The combination with a vehicle body structure including a body pillar to which a vehicle door is hinged and having an upper section having a transverse section defining one side of an opening for the door, a jamb portion for engagement by an overlapping flange on the door and an overhanging flange to conceal the space between the jamb portion and the overlapping flange; of:

a weather strip extending along a transverse portion of the

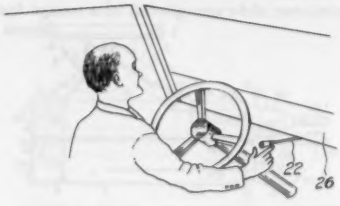
door at the laterally inner side of the overlapping flange between the jamb portion and the overlapping flange, said weather strip comprising an elongated resiliently deformable strip having a base portion sealed on the transverse portion on the door and on the laterally inner side of the overlapping flange, a first lip portion extending from the base portion to yieldably engage the jamb portion and a second lip portion integral with the first lip portion to yieldably engage the overhanging flange.

4,026,599

MANUALLY OPERABLE DOOR RELEASE FOR VEHICLES

Henry G. Floyd, Plant City, Fla., assignor to The Raymond Lee Organization, Inc., a part interest

Filed Dec. 29, 1975, Ser. No. 644,732
Int. Cl.² B60J 5/04
U.S. Cl. 296—146 **4 Claims**



1. In combination with a vehicle having a door which is locked by pushing a vertical rod downward and which is unlocked by raising the rod, a manually operable device for unlocking the door once locked, said rod having a top disposed enlarged head, said device comprising:

a sleeve vertically and slidably disposed along said rod;

a ring slidable along the rod and disposed below said sleeve;

a cable secured at one end to the ring;

spring loaded means coupled to the other end of the cable and connected to the vehicle at a point remote from the door to hold the cable taut;

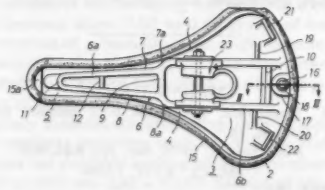
a control lever pivotally secured to said vehicle at another point remote from the door, said lever being coupled to said means and the other end of the cable, said lever when pivoted in a selected direction, moving said means and cable to exert a lifting motion on said ring via said cable, said ring pushed upward against the sleeve to push the sleeve upward against said head to raise the rod and unlock said door.

4,026,600

PLASTIC SADDLE FOR BICYCLE

Katuhiko Kutaguchi, Sakai, Japan, assignor to Taihei Kogyo Co., Ltd., Japan

Filed July 10, 1975, Ser. No. 594,753
Int. Cl.² B62J 1/18
U.S. Cl. 297—214 **3 Claims**



1. A plastic saddle for a bicycle said saddle comprising:

a saddle base, having front and rear portions, said base including a downwardly extending flange along the entire periphery thereof, wherein the distance between the portions of said flange on each side of said base is reduced towards the front portion of said base;

a pair of arched shaped base support members integral with the bottom of said base each said base support member comprising a front portion gradually slanting upward towards the front of said base, a rear portion abruptly slanting upward towards the rear of said base, and a step portion interconnecting said front and rear portions of said support members,

connecting means integral with said support members for interconnecting said support members thereby reducing deformation thereof,

a shock absorbing elastic member positioned on top of said base; and

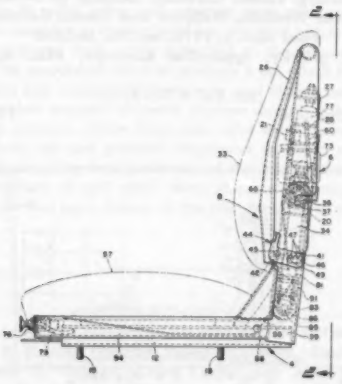
a saddle cover fitted over said elastic member, said saddle cover including a gripping means along the periphery thereof, said gripping means being fitted over the flange of said base and gripping the flange of said base, and wherein the distance between the stepped portion of said support members and the flange of said base is such that said gripping means is held therebetween thereby preventing said gripping means from disengaging said flange.

4,026,601

AIR SUSPENSION SEAT ASSEMBLY

John L. Dill, III, Mansfield, and Othar P. Kennedy, Jr., Mount Vernon, both of Ohio, assignors to National Seating Company, Mansfield, Ohio

Filed June 23, 1975, Ser. No. 589,568
Int. Cl.² A47C 1/02
U.S. Cl. 297—345 **13 Claims**



1. A seat assembly for vehicles and the like comprising a fixed frame mounted to the vehicle, a vertically movable frame carrying the seat back and seat cushion, and resilient suspension means connecting the movable frame to the fixed frame, said suspension means including expandable air spring means and a support for one end of said air spring means, said support being relatively movable with respect to both said fixed and movable frames and being guided by said frames, the other end of said air spring being connected to one of said frames, whereby the air spring is operative to provide a cushioning effect during use and is selectively operative to drive the movable frame relative to the fixed frame.

4,026,602
APPARATUS FOR MECHANICALLY BREAKING UP STONE OR REINFORCED CONCRETE

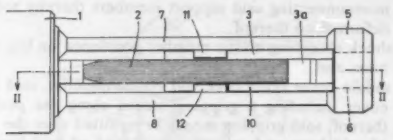
Hans Bieri, Wohlen, Switzerland, assignor to H. Bieri AG, Liebefeld, Liebefeld, Switzerland

Filed Jan. 12, 1976, Ser. No. 648,138

Claims priority, application Switzerland, Jan. 31, 1975, 1152/75

Int. Cl.² E21C *37/02*

U.S. Cl. 299—22 **3 Claims**



1. An apparatus for mechanically breaking up stone or reinforced concrete, said apparatus comprising a cylinder, a hydraulically-operated piston disposed for longitudinal movement within said cylinder, a piston rod, a thrust wedge connected to said piston by said piston rod, and two removable symmetrically-disposed insertion pieces adapted for insertion into holes bored in said stone or concrete and each comprising an inclined portion having the same angle of inclination as said wedge, said insertion pieces being freely movable away from one another laterally and being secured against longitudinal displacement, and said piston being adapted to act upon said insertion pieces via said wedge, said apparatus further comprising a bracing part longitudinally spaced from said cylinder, a passage in said bracing part for said wedge, and two tie plates respectively extending on each side of said wedge, said bracing part being rigidly joined to said cylinder by said tie plates, and said insertion pieces each having a flat end face at the end thereof remote from said cylinder said end faces being braced against said bracing part.

4,026,603
MINING INSTALLATIONS

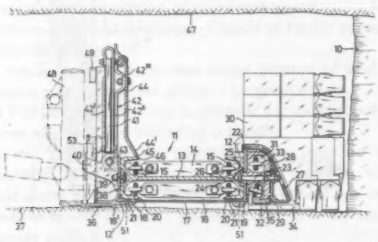
Werner Georg, Lunen, Germany, assignor to Gewerkschaft Eisenhutte Westfalia, Wethmar near Lunen, Germany

Filed Mar. 1, 1976, Ser. No. 662,608

Claims priority, application Germany, Mar. 6, 1975, 2509801

Int. Cl.² E21C *35/20*

U.S. Cl. 299—34 **15 Claims**



1. In a scraper-chain conveyor for use in mining; said conveyor comprising side walls and a floor defining upper and lower passages and a scraper-chain assembly movable within the passages to transport material along the floor, support members being secured to the side walls to provide slots between the lower surfaces of the side walls and the support members, and bottom plates being located in the slots and supported by the support members to close off the lower passage, the support members forming part of components detachably secured to the side walls; the improvement comprising providing said components with portions engaging on the external lateral surfaces of the side walls and detachably thereto, said portions of the components at the mineral face side wall of the conveyor being in the form of plates to which a guide means for supporting a machine is secured.

4,026,604
GROUND EXCAVATING APPARATUS

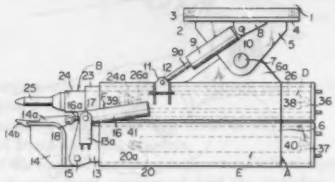
Mitsuteru Motomura, Kamakura; Chiaki Kojima, Tokyo; Hiroshi Ohta, Chigasaki, and Akira Nemoto, Tokyo, all of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Sept. 24, 1975, Ser. No. 616,289

Claims priority, application Japan, Sept. 30, 1974, 49-111412; Sept. 30, 1974, 49-111413; Sept. 30, 1974, 49-111414

Int. Cl.² E21C *35/02*

U.S. Cl. 299—64 **6 Claims**



1. A ground excavating apparatus comprising,
a fixed member,
a supporting member which is fitted in place on said fixed member,
a guide boom fitted in place on said supporting member in a manner of being capable of traveling in the forward and rearward directions,
means for conducting impact crushing fixed in place on the front end section of said guide boom, and capable of traveling in the forward and rearward directions together with said guide boom,
a bucket boom fitted in place on said supporting member on the lower side on said guide boom in a manner of being capable of moving in the forward and rearward directions,
a bucket pivotally fitted in place on the top end section of said bucket boom in a manner of being capable of inclining for actuation,
primary means of operation set in place on said supporting member, and operates said guide boom in a manner of being actuated so as to move in the forward and rearward directions,
secondary means of operation set in place on said supporting member to operate said bucket boom so as to move said bucket in the forward and rearward directions,
primary means of inclination operation set in place on said bucket boom for inclining said bucket, and
secondary means of inclination operation to make connection between said fixed member and said supporting member, and incline said supporting member.

4,026,605
MINING TOOL

Kenneth C. Emmerich, Lexington, Ky., assignor to Fansteel Inc., N. Chicago, Ill.

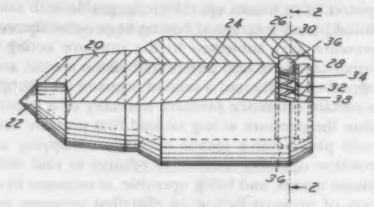
Filed Jan. 6, 1976, Ser. No. 646,905

Int. Cl.² E21C *13/00*

U.S. Cl. 299—92 **4 Claims**

1. A mining tool comprising a tool head having a hard cutting insert at one end and a mounting shank at the other end to be rotatably received and retained in a cylindrical

recess of a mounting device, said head having a shoulder at the cutting end to carry axial load, and a retaining device at the other end comprising a transverse hole in said shank, a spring retained in said hole, at least one ball in said hole backed by



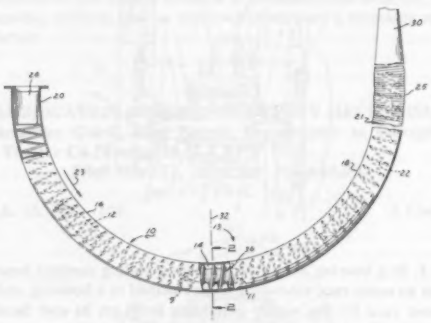
said spring and means at the outer end of said hole to retain said ball in an equatorial region, said ball having a projecting portion to contact a portion of the cylindrical recess to retain said shank against axial dislodgment while permitting rotation of said shank.

4,026,606

CONVEYING LIGHTWEIGHT PLASTIC ARTICLES

Dick S. Williams, Creve Coeur, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Aug. 21, 1975, Ser. No. 606,707
Int. Cl.² B65G *51/02*
U.S. Cl. 302—2 R **4 Claims**



1. In a method of air conveying bottles along a curved path weighing between about 0.03 to 0.13 gr./cc. of internal volume and formed of a biaxially molecularly oriented thermoplastic material having wall portions with orientation levels of at least about 3.5 kg./cm.² orientation relief stress, the improvement comprising:

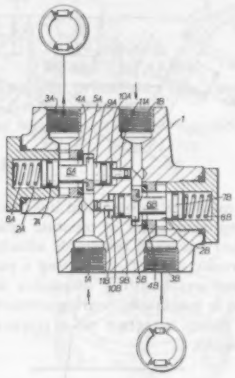
successively cushionably supporting such bottles on their outer surfaces including such molecularly oriented wall portions, on yieldable bristles having a diameter of about 0.005 to 0.05 cm. and a bristle density of about 500 to 4000 per square inch of area as they proceed along such curved path to substantially avoid surface scratching of such wall portions during said conveying movement.

4,026,607

BRAKE PRESSURE CONTROL VALVES FOR SPLIT BRAKING SYSTEMS

Wolfgang Hess, Koblenz, and Reiner Viebahn, Neuwied, both of Germany, assignors to Girling Limited, Birmingham, England

Filed Feb. 19, 1975, Ser. No. 551,009
Claims priority, application United Kingdom, Feb. 20, 1974, 7796/74
Int. Cl.² B60T *8/18, 8/26*
U.S. Cl. 303—6 C **5 Claims**



1. A valve assembly for use in a vehicle braking system, having separate wheel brakes and separate pressure sources, comprising first and second valves having respective inlets for connection to said separate pressure sources and respective outlets for connection to said separate wheel brakes, wherein each valve includes a movable valve part carried by an associated pressure responsive member, a stationary valve part cooperating with the movable part to control communication between the inlet and outlet, said stationary valve part being stationary at all times, and biasing means applying a biasing force urging said pressure responsive member in a direction to maintain its valve open, and wherein each said pressure responsive member is stepped and has opposed piston of different dimensions, both being subjected to the pressure at the inlet of its associated valve to produce a net effect tending to close that said valve in opposition to said biasing means, and has a further stepped diameter portion directly subjected to the inlet pressure of the other said valve to produce an additional force on said pressure responsive member, said additional force acting independently of the biasing force of the biasing means of said other valve and said additional force being removed upon failure of the inlet pressure of said other valve.

4,026,608

LOW GROUND PRESSURE TRACK SHOE

Danny J. Becker, Peoria; Roger L. Boggs, East Peoria; Kenneth E. Vaughn, Creve Coeur, and James Richard Shuler, Eureka, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Division of Ser. No. 517,495, Oct. 24, 1974, Pat. No. 3,937,529. This application Aug. 18, 1975, Ser. No. 605,774
Int. Cl.² B62D *55/28*
U.S. Cl. 305—54 **14 Claims**

1. The combination comprising

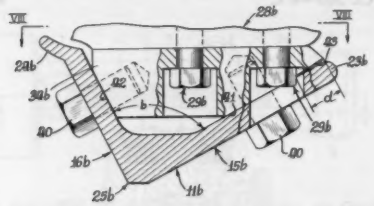
a track shoe including a pair of downwardly converging sidewalls forming a trough-like construction having a V-shaped cross section at least substantially throughout the entire width thereof,

a common grouser portion formed at lower apex ends of

said sidewalls to extend the entire width of said track shoe,

generally horizontally disposed first and second lugs each formed on an upper end of a respective one of said sidewalls to extend the entire width of said track shoe, the first lug of said track shoe adapted to overlap a second lug of another adjacent track shoe,

a pair of link means disposed between lateral ends of said track shoe and straddling the sidewalls thereof between said first and second lugs, and



attachment means, attaching said link means to said track shoe, comprising a pair of separate bearing blocks confined within and each releasably attached to said track shoe internally thereof and having a pair of converging bearing surfaces abutting respective sidewalls of said track shoe in substantial bearing contact therewith, each said link means attached on a respective one of said bearing blocks.

4,026,609

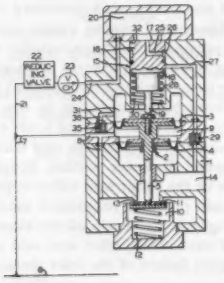
PRESSURE REDUCTION AND PRESSURE REDUCTION RATE SENSITIVE EMERGENCY VENT VALVE

Robert J. Bridigum, Plum Borough, Pa., assignor to Westinghouse Air Brake Company, Wilmerding, Pa.

Filed Aug. 26, 1976, Ser. No. 717,984

Int. Cl.² B60T *15/44*

U.S. Cl. 303—82 **7 Claims**



1. An emergency vent valve device for railway vehicles of a train having a brake pipe normally charged with fluid pressure at a certain degree and effective upon reduction of fluid pressure therein for initiating a brake application on the train, said vent valve device comprising:

a. a casing;

b. a vent valve member for controlling atmospheric communication between the brake pipe and atmosphere, said vent valve member normally occupying a closed position in which said communication is closed and being operable to an open position in which said communication is open;

c. differential piston means subjected on one side to brake pipe pressure unrestrictedly and on an opposite side to said brake pipe pressure at a controlled rate via a rate-sensitive choke of preselected flow rate capacity, said differential piston means normally occupying, coincidentally with a balanced state of forces acting thereon, a neutral position in which said vent valve member is operated to its closed position, and being operable, in response to a reduction of pressure acting on said one side thereof at a rate exceeding the flow rate capacity of said rate-sensitive choke, to a vent position in which said vent valve member is operated to its said open position; and

d. piston valve means operably engageable with said differential piston means and having at one end thereof a first pressure area subjected to the pressure acting on said opposite side of said differential piston means, and at the opposite end thereof a second pressure area subjected to a certain reference pressure normally of a lesser degree than the pressure acting on said first pressure area,

e. said piston valve means normally occupying a cut-off position operably ineffective relative to said differential piston means, and being operable, in response to a reduction of pressure acting on said first pressure area to a degree less than said reference pressure, to an exhaust position in which said differential piston means is engaged and operated to its said vent position.

4,026,610

ROLLING CONTACT BEARING SYSTEM

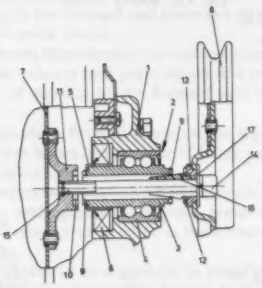
Günter Neder, and Armin Olschewski, both of Schweinfurt, Germany, assignors to SKF Industrial Trading and Development Company, B.V., Nieuwegein, Netherlands

Filed May 20, 1975, Ser. No. 579,267

Claims priority, application Germany, May 25, 1974, 7418153[U]

Int. Cl.² F16C *33/30*

U.S. Cl. 308—236 **12 Claims**

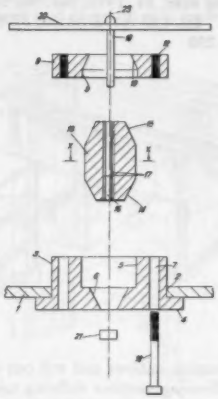


1. In a bearing assembly wherein a rolling contact bearing has an outer race extending to and affixed to a housing, and an inner race having axially extending teeth on its end faces, a driving member engaging one said end face, a driven member engaging the other said end face, and a through-bolt extending through the inner bore of said inner race for clamping said driven member, inner race and driving member together, whereby torque is transmitted from said driving member to said driven member by way of said inner race and the teeth on the end faces thereof; the improvement comprising an auxiliary assembly sleeve engaging one of said driving and driven members and fitted over said through-bolt for precentering said members with respect to said inner race, said sleeve being in friction-tight engagement with the inner bore of said inner race whereby said inner race is rotatable with said through-bolt to enable mating of said teeth on said inner race and members during assembly thereof.

4,026,611
BEARING ARRANGEMENT

Colin Howard Stanwell-Smith, Cambridge, and John Alfred William Aldous, Huntingdon, both of England, assignors to Strathearn Audio Limited, Belfast, Northern Ireland

Filed Dec. 3, 1975, Ser. No. 637,182
Claims priority, application United Kingdom, Dec. 4, 1974, 52517/74
Int. Cl.² F16C 13/00
U.S. Cl. 308—15 5 Claims

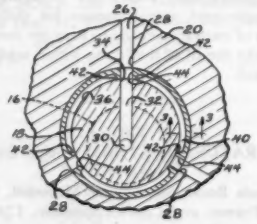


1. A bearing assembly for a shaft including a first integral member defining bearing surfaces for the shaft, a tapered outer surface at each end of the first member, second and third members each defining an internally tapered surface arranged to cooperate with a respective one of the tapered outer surfaces and adjustable clamp means arranged to clamp the second and third members towards one another and to exert pressure upon the first member to cause the bearing surfaces to be moved towards a common axis, whereby the bearing surfaces can be adjusted to support a rotatable shaft therein.

4,026,612
LUBRICATION OF SEALS IN ROTARY MECHANISMS

Alexander Goloff, East Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Mar. 22, 1976, Ser. No. 668,992
Int. Cl.² F01C 1/02
U.S. Cl. 308—106 5 Claims

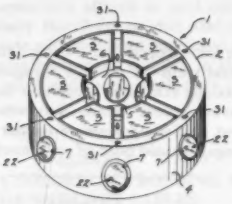


1. In a rotary mechanism, the combination of:
a housing defining an operating chamber;
a shaft journalled in said housing and having an eccentric within said chamber, said shaft including an oil passage adapted to be in fluid communication with a source of oil under pressure and terminating in an opening in the periphery of said eccentric;
a rotor within said chamber and journalled on said eccentric, said rotor mounting a seal sealingly engaging said housing and including a lubricating conduit for directing oil to said seal, said conduit terminating in a port facing said eccentric and alignable with said opening;
an annular bearing interposed between said eccentric and said rotor to minimize friction thereat, said bearing including a port extending therethrough;
one of said bearing and said rotor including an annular, radially inwardly opening, oil distributing groove and a dam in said groove about the port in the one of the rotor and the bearing having the groove.

4,026,613
THRUST BEARING

Joseph L. Moravchik, Brookfield, Wis., assignor to Orion Corporation, Grafton, Wis.

Filed Mar. 10, 1976, Ser. No. 665,487
Int. Cl.² F16C 17/06
U.S. Cl. 308—160 6 Claims



1. A self-equalizing thrust bearing includes:
a. a retaining ring having a plurality of axial apertures spaced equally apart and an equal plurality of radial apertures each of which intersects two adjacent axial apertures,
b. an equal plurality of thrust shoes arranged circumferentially around the ring,
c. an equal plurality of axially movable support pins each positioned in its own axial aperture in said ring, said support pins having a top surface which is adapted to coact with the bottom surface of a thrust shoe positioned upon it to allow said shoe to tilt and align in response to pressure upon the upper surface of said shoe and to prevent the shoe from rotating within the ring, the support pins being further provided with ledges on their opposite circumferential sides, and
d. an equal plurality of equalizing pins each of which is positioned in its own radial aperture, said equalizing pins having shoulders that are engagable with the ledges of the support pins positioned in each of the intersected axial apertures so that when a thrust shoe moves toward the ring its support pin moves in its axial aperture to cause each of the adjacent equalizing pins which it contacts to rotate within its radial aperture to move another support pin which it contacts and a thrust shoe associated with that support pin away from the ring.

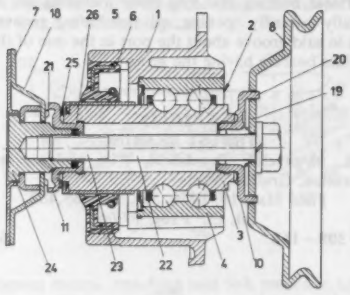
4,026,614
ROLLING CONTACT BEARING ASSEMBLY

Günter Neder, Schweinfurt, Germany, assignor to SKF Industrial Trading and Development Company, B.V., Nieuwegein, Netherlands

Filed May 20, 1975, Ser. No. 579,269
Claims priority, application Germany, May 25, 1974, 2425350
Int. Cl.² F16C 13/00, 33/00
U.S. Cl. 308—189 R 9 Claims

1. In a bearing assembly wherein a rolling contact bearing is affixed to a housing and has an outer race fixed to the housing and an inner race, wherein a driving member, the inner race

and a driven member are clamped together by a through-bolt extending through the driving member, the inner bore of the inner race and the driven member; the improvement wherein at least one end face of said inner race is provided with axially extending teeth, and further comprising a stepped sleeve between said one end face and the respective member at said



one end face said stepped sleeve being deformable by engagement with said teeth for positive engagement therebetween, and having axially extending projection means, the respective member having recess means into which said projection means extend, said stepped sleeve further extending into and positively engaging said bore of said inner race.

4,026,615

CONTAINER FOR MAGNETIC TAPE CASSETTE

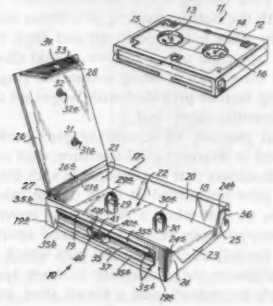
Teruo Tazaki, Tokyo; Shinichiro Takahashi, Yokohama; Teruyasu Shimozu, Tokyo, and Kazumi Fujimoto, Hoya, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Mar. 25, 1976, Ser. No. 670,413

Claims priority, application Japan, Apr. 1, 1975, 50-44440[U]; Nov. 13, 1975, 50-154548[U]

Int. Cl.² B65D *85/67*; A47B *87/00*

U.S. Cl. 312—12 **16 Claims**



1. A container for storing a magnetic tape cassette comprising a one-piece housing including a substantially rectangular bottom wall, and side walls and a back wall directed upwardly along the opposite side and back margins, respectively, of said bottom wall to define a cavity which is open at the top for receiving a cassette and has an opening at the front of the housing extending substantially down to said bottom wall and through which access may be had to a cassette in the cavity for upwardly dislodging the cassette therefrom, and a top wall hingedly connected, at one end, to the top of said back wall for swinging between an upwardly directed opened position and a closed position in which said top wall extends between said side walls to close said cavity at the top of the latter, said top wall having a depending flange at the end thereof remote from its hinged connection to said back wall for closing said opening at the front of the housing in said closed position of the top wall; and means engageable in said closed position of the top wall for releasably holding the latter in said closed position.

4,026,616

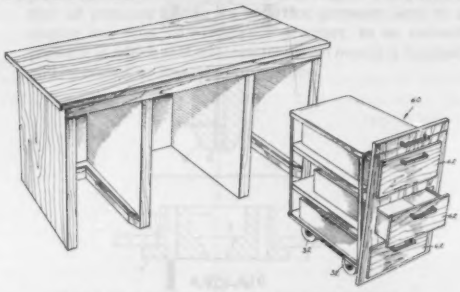
COMBINATION CABINET AND ROLL OUT DRAWER CART

Wilbert F. Kuehl, 528 Britain Ave., Benton Harbor, Mich. 49022

Filed Mar. 24, 1975, Ser. No. 561,430

Int. Cl.² A47B *88/00, 87/00*

U.S. Cl. 312—250 **2 Claims**



1. A combination cabinet and roll out drawer component comprising a housing member defining said cabinet and supporting a generally flat top, said housing member including a front part having an opening formed therein beneath said top, said opening extending upwardly from a supporting foundation for said housing member and terminating below said top, said housing member including guide parts projecting upwardly from said foundation, one of said guide parts located on each side of said opening, said guide parts being spaced apart and extending rearwardly from said opening in convergent directions, said drawer component including a frame having a front and a back interconnected by sides, wheel means contacting said foundation for supporting said frame for movement over the foundation, a panel secured to said frame at its front, the sides of said frame extending from the front toward the back of the frame in convergent directions, said frame including a plurality of shelves extending from the front to the back of the frame and positioned behind said panel, said frame fitting in wedge-like fashion within said housing opening with said sides of the frame engaging said housing member guide parts, and gripping means carried by said panel for pulling upon said panel to remove said frame from said housing opening, said frame sides each including shiftable contact strip means for engaging a said housing member guide part, spacer means for shifting said contact strip means of each frame side to vary the convergence of said sides whereby the fit of the frame within said housing opening can be varied.

4,026,617

APPARATUS FOR STORING AND DISPLAYING ARTICLES

Jean-Francois Bosio, 56, Avenue Massenet, 93150 Le Blanc-Mesnil, France, and Charles Spindler, 124, Blvd. Magenta, 75010 Paris, France

Continuation-in-part of Ser. No. 466,633, May 3, 1974, abandoned. This application June 16, 1975, Ser. No. 586,951

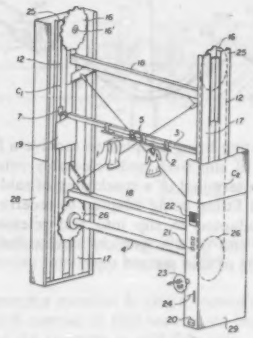
Claims priority, application France, Dec. 12, 1973, 73.44688

Int. Cl.² A47F *5/00*; B65G *17/00*

U.S. Cl. 312—268 **1 Claim**

1. An apparatus for storing and displaying articles comprising:

1. a pair of uprights;
2. a pair of endless movable link chains on said uprights respectively, each chain having two vertically extending courses of chain links sequentially connected by pivot pins;
3. moving means for moving respective corresponding course of said link chains in unison, respective pivot pins of said corresponding courses being hollow;
4. an axle received in each of said hollow pivot pins, each axle in the hollow pivot pins of one course defining a common axis with an axle in the corresponding other course;
5. a bracket mounted on each of said axles for angular movement about said common axis, each bracket having



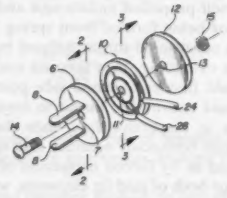
a forked part downwardly spaced from said common axis and defining a slot open axially in an upward direction;
6. an elongated bar member associated with each pair of said axles having a common axis and with the brackets mounted on said axles, the two longitudinal end portions of each bar member being each formed with an annular groove engaged by the forked part of one of the associated brackets in said slot, said grooves and said forked parts being dimensioned to prevent axial dioplacement of said end portions in said slots relative to the associated brackets; and
7. a cotter pin releasably received in each forked part and closing the slot of said forked part in an upward direction, whereby upward displacement of the bar member out of said slot is prevented.

4,026,618

LOW PROFILE ELECTRICAL MALE PLUG

Robert J. Straka, 2422 S. 2nd Ave., North Riverside, Ill. 60546

Filed Dec. 31, 1975, Ser. No. 645,540
Int. Cl.² H01R *39/00*
U.S. Cl. 339—8 P **3 Claims**



1. A low profile electrical plug having a rotatable selectively positionable electric cord connection comprising

a prong plate having an insulating body member with a pair of spaced electrical prongs on one side thereof and a prong conductor coupled to each of said electrical prongs on the other side thereof;

a rotatable electric cord plate having an insulating body member;

said prong plate and said cord plate being proportioned to provide a low profile electrical plug when pivotally secured together in a sandwich-type relationship;

a spaced pair of outer and inner conductors on said prong plate and a pair of outer and inner conductors on said cord plate which are spaced and positioned to electrically and conductively contact the respective outer and inner conductors on said prong plate when said prong plate and said cord plate are secured together in sandwiched relationship, said outer and inner conductors on said prong plate and said cord plate being disposed with annular grooves in the insulating body member and said outer and inner conductors on the other one thereof being adapted to seat within said annular grooves to establish electrical contact therewith, said outer and inner conductors further being joined so as to provide continuous electrical contact as said prong plate and said cord plate are selectively rotated with respect to one another; and

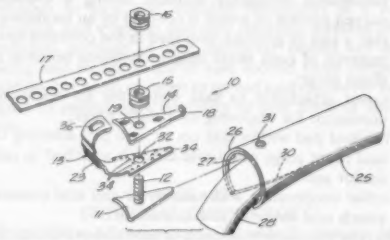
electric cord conductors affixed to said cord plate and extending radially therefrom so that said electric cord conductors rotate with said cord plate, said electric cord conductors being electrically coupled to the respective ones of said outer and inner conductors on said cord plate.

4,026,619

HIGH CAPACITY SOLDERLESS BONDING ASSEMBLY FOR SHIELDED CABLES

George W. Gillemot, Santa Monica, Calif., assignor to John T. Thompson, Santa Monica, Calif., a part interest

Continuation of Ser. No. 506,236, Sept. 16, 1974, abandoned.
This application Dec. 8, 1975, Ser. No. 638,749
Int. Cl.² H01R *3/06*
U.S. Cl. 339—14 R **9 Claims**



1. A cable bonding assembly for use in making a dual-conductive-path connection to the shield of a shielded and sheathed cable, wherein the cable shield is located inwardly of the cable sheath, including:

a. an inner conductive shoe insertable under the cable shield;

b. a threaded conductive fastener having an inner end securable to said inner shoe;

c. a generally U-shaped conductive strap having an inner leg provided with an aperture to receive said threaded fastener and insertable under the cable shield between the cable shield and said inner shoe;

d. an outer conductive shoe having an aperture to receive said threaded fastener and adapted to overlie the cable sheath;

e. inner conductive nut means threadable on said threaded fastener outwardly of said outer shoe and adapted to clamp said outer shoe against the cable sheath and to cause said inner shoe to clamp said inner leg of said generally U-shaped strap against the cable shield;

f. said generally U-shaped strap having an outer leg provided with an aperture to receive said threaded fastener outwardly of said inner nut means; and

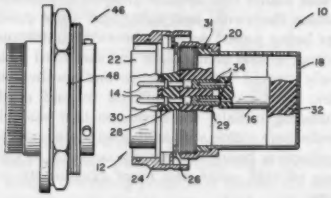
g. outer nut means threadable on said threaded fastener outwardly of said outer leg of said generally U-shaped strap to clamp outer leg against said inner nut means.

4,026,620

CONTROL FUNCTION SELECTION CONNECTOR

Morris S. Lieberman, Silver Spring, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 28, 1976, Ser. No. 653,047
Int. Cl.² H01R *31/08*
U.S. Cl. 339—19 **1 Claim**



1. In combination with a control mechanism having a plurality of circuits provided with branch termini, a connector assembly attachable to the termini to permit the external selection and alteration of the circuits within the control mechanism comprising:

a connector housing for attachment to the control mechanism;

a plurality of insulated pins within said connector housing for engaging connection with the termini of the circuits;

a plurality of removable shunt plugs connectable with said insulated pins, each of said shunt plugs comprises a single continuous conductor element having a U-shape, the curved portion of which is covered by an insulating material, a pair of grooves, provided in the covering insulating material of each shunt plug to facilitate removal of said shunt plugs;

a cover attachable to said connector for enclosing said connector for enclosing said shunt plugs;

a resilient pad within said cover, said pad abutting each of said shunt plugs when said cover is attached to said connector and

a collar cooperating with said cover and said connector to attach said cover to said connector.

whereby connection of each of said removable shunt plugs with selected pairs of said termini completes the circuit associated with said selected pairs of termini and removal of each said shunt plugs opens the circuit associated with said selected pairs of termini.

4,026,621

TIMING LIGHT ADAPTOR

Michael A. Korba, 2333-A N. Fiarview, Burbank, Calif. 91505

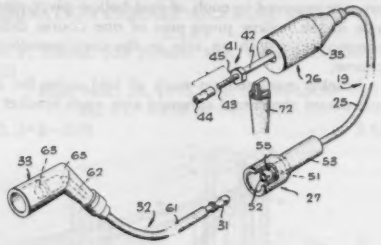
Filed Aug. 8, 1975, Ser. No. 603,131
Int. Cl.² H01T *13/04*
U.S. Cl. 339—26 **8 Claims**

1. An adaptor for connecting an ignition timing light with internal combustion engines employing spark plugs of a first type, having central elctrode terminals of one configuration, and with such engines employing spark plugs of a second type, having central electrode terminals of another configuration, the terminal ends of ignition wires being releasably retained over said central electrode terminals, said adaptor comprising:

a first elongated insulated flexible electrical conductor;

a first fitting at one end of said conductor adapted to slip over and releasably retain the central electrode terminal of a spark plug of said first type;

a second fitting at the other end of said conductor adapted to slip into and releasably retain the terminal end of the ignition wire associated with said spark plug of said first type, and having an exposed portion for attachment of the timing lead from said timer;



said first fitting being adapted to receive a first connector, adapted to slip over and releasably retain the central electrode terminal of a spark plug of said second type;

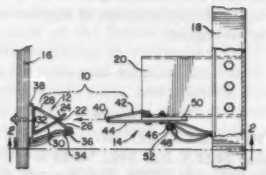
said second fitting being adapted to receive a second connector, adapted to slip into and releasably retain the terminal end of the ignition wire associated with said spark plug of said second type.

4,026,622

ELECTRICAL CONNECTORS AND ASSEMBLY THEREOF

Anthony J. Siciliano, Vineland, N.J., assignor to Diamond International Corporation, New York, N.Y.

Filed Apr. 2, 1976, Ser. No. 672,957
Int. Cl.² H01R *13/62*
U.S. Cl. 339—65 **11 Claims**

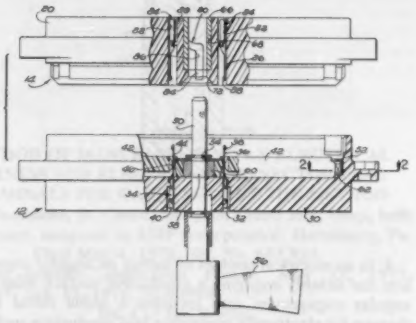


1. Electrical connector member particularly adaptable for use in automatically establishing electrical contact between the terminal of a self-propelled mobile unit and a fixed terminal, said connector being formed from spring metal material and comprising a constricted throat defined by first and second side portions extending from secured ends to said constricted throat, said first and second side portions diverging outwardly from said constricted throat to form first and second lip elements at respective free ends thereof whereby admission of a male connector member into said constricted throat is facilitated as by forced expansion of said throat as guided by either or both of said lip elements, with at least one of said lip elements being substantially longer than the other of said lip elements and electrical lead attaching means being provided adjacent the free end of said one of said lip elements to ensure adequate clearance for a male connector member passing thereby to or from said constricted throat.

4,026,623
ZERO FORCE CONNECTOR

David S. Goodman, Mission Viejo, and Leslie M. Borsuk, Los Alamitos, both of Calif., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Mar. 8, 1976, Ser. No. 664,994
Int. Cl.² H01R 13/54
U.S. Cl. 339—75 M 8 Claims



1. An electrical connector assembly comprising:

a first connector member having a first set of contacts therein;

a second connector member having a second set of contacts therein, each contact in said second set being associated with one of the contacts in said first set;

the associated contacts of said first and second sets of contacts being positioned laterally adjacent to but spaced from each other when said connector members are mated;

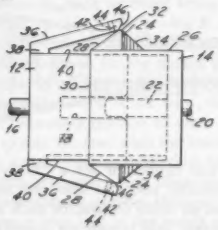
first means for laterally moving said first set of contacts to engage said second set of contacts;

second means for shifting said first and second connector members axially relative to each other to cause an axial wiping engagement between the associated contacts of said first and second sets of contacts, operation of said second means drawing said connector members together.

4,026,624
LOCKING STRUCTURE FOR ELECTRICAL CONNECTORS

John Boag, Ferndale, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Sept. 3, 1976, Ser. No. 720,289
Int. Cl.² H01R 13/12, 13/54
U.S. Cl. 339—91 R 3 Claims



1. In combination with a pair of matable electrical connectors, easily releasable overcenter locking structure comprising:

a double ramp member formed on one of the matable connectors, said double ramp member having a first inclined ramp surface of generally fixed width leading from a front face of the one connector upwardly to an apex and a second inclined ramp surface leading downwardly from said apex in a direction away from said first inclined ramp surface to a surface of the one connector; said apex of said double ramp member being intermediate the locations at which said first and said second inclined ramp surfaces intersect the surface of the one connector; said second ramp surface having a wedge shape when viewed looking directly downwardly at said apex of said double ramp member, the wide portion of said wedge shape being at said apex and the narrow portion of said wedge shape being at the point of intersection of said second ramp surface and the surface of the connector; and

a pair of cantilever beams formed on the other of the matable connectors, supporting portions of each of said cantilever beams extending upwardly from a rear portion of a surface of the other connector with said cantilever beams projecting forwardly therefrom in a parallel, spaced relationship towards a front face of the other connector; the spacing between said cantilever beams being slightly greater than said generally fixed width of said first inclined ramp surface of said double ramp member; each of said cantilever beams having at its free end an enlarged portion which projects into the space between said cantilever beams towards but not into engagement with said enlarged portion on said other one of said cantilever beams whereby a small space exists between said enlarged portions; each of said enlarged portions having a cam releasing surface which, when viewed from directly above said cantilever beams, is inclined inwardly from said small space between said enlarged portions generally towards a rear portion of said cantilever beam with which said enlarged portion is associated, each of said enlarged portions also having a cam locking surface which, when viewed from said front face of the other connector, extends generally downwardly and rearwardly from a top surface of each of said cantilever beams;

whereby said cantilever beams are deflected upwardly by engagement of said cam locking surfaces and said first inclined ramp surface of said double ramp member during movement of said pair of matable connectors towards a mated position, whereby said cantilever beams and said enlarged portions thereof surround said double ramp member to lock said matable connectors in a mated position, and whereby said cam releasing surfaces of said enlarged portions of said cantilever beams are drawn along said wedge shape of said second ramp surface of said double ramp member to spread said cantilever beams apart to permit easy unmating of said matable connectors.

4,026,625
UNIVERSAL CONNECTOR

Russell A. Roiko, Minneapolis, and James D. Throne, Maple Grove, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

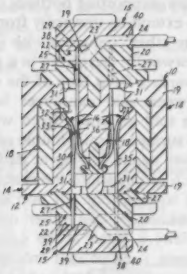
Filed Nov. 10, 1975, Ser. No. 630,219
Int. Cl.² H01R 13/38
U.S. Cl. 339—99 R 3 Claims

1. A connector comprising:

an insulating body formed on one surface with a plurality of parallel wire support channels, each of said channels being formed with a transverse step defining upper and lower wire support levels, adjacent channels being formed with steps rising from generally coplanar lower wire support levels to generally coplanar upper wire support levels in opposite directions lengthwise of said channels to position a lower wire support level between two upper wire support levels, said body being formed with a plurality of apertures therethrough, one aperture extending across the lower wire support level of each said channel,

a plurality of spring compression reserve contact elements carried by said body, each said contact element comprising an elongate contact body and a bifurcate insulation stripping and conductor connecting end connected to

said contact body coplanar with the adjoining portion thereof, the centerline of the bifurcation lying parallel to the length of said contact body and offset from the centerline of said contact body a distance equal to one-half of the spacing between said wire support channels, a bifurcate contact connecting end of a contact element extending through each said aperture in said body to make electrical connection to a wire supported on each said lower wire support level and terminating below the adjoining upper wire support level with the outer edges of



the legs thereof abutting the adjoining upper suport levels of said body,

a cover formed on one surface with parallel stepped wire support channels complementary to said channels on said body, and

means for retaining said cover on said body with said complementary channels aligned and the wires in the bifurcations of said contact elements to support and retain the wires in said channels and to make electrical connection between said contact elements and the wires.

4,026,626

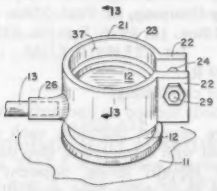
DETACHABLE BATTERY CLAMP

Ricardo E. Cucalon, Panama City, Panama, assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Aug. 30, 1976, Ser. No. 718,784

Int. Cl.² H01R 11/26

U.S. Cl. 339—226 **2 Claims**



1. A battery clamp which is readily detached from engagement with a battery pole, comprising

a battery clamp in the form of a split sleeve shaped to fit around a cylindrical pole of a battery, said sleeve fitted on its internal surface with a radially projecting detent which divides the internal surface of the sleeve into a contact section that may fit about a battery pole and a grip section that extends beyond the engaged battery pole, said grip section adaptable for being spread apart by the jaws of a plier extended into the grip section.

4,026,627

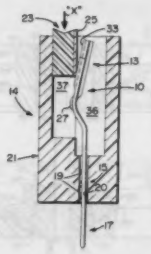
ELECTRICAL CONTACT AND CONNECTOR

John Eugene Benasutti, Warren, Pa., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed June 23, 1976, Ser. No. 698,832

Int. Cl.² H01R 13/02

U.S. Cl. 339—278 C **10 Claims**



1. In an electrical contact including an angular engagement arm for slidably engaging a conductive surface wherein said angular engagement arm includes a noble metal segment thereon for electrically contacting said conductive surface and means for preventing transfer of material from said arm onto said noble metal segment, the improvement wherein said material transfer prevention means comprises:

at least one elongated blade adjoining said noble metal segment and including at least one edge thereon wherein said edge is offset on said angular engagement arm from said noble metal segment relative to the direction of movement of said conductive surface during said sliding engagement by said arm, said blade having a cross-sectional configuration of substantially uniform thickness and formed so that only said edge slidably engages said conductive surface prior to said electrical contact between said surface and said noble metal segment.

4,026,628

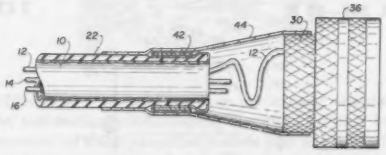
ELECTRICAL CONNECTOR FOR CABLES AND MAGNETIC FORMING PROCESS FOR SAME

Morris V. Duffner, Garden City, and Alexander Mintz, Smithtown, both of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.

Division of Ser. No. 569,690, April 21, 1975, Pat. No. 3,992,773. This application Dec. 18, 1975, Ser. No. 642,080

Int. Cl.² H01R 17/08

U.S. Cl. 339—177 E **4 Claims**



1. An electrical connector for a coaxial cable of the type including a dielectric about at least one inner conductor between same and an outer conductor such as a braided sheath over said dielectric, said connector comprising:

a connection nut having provision for the inner conductor;

an insulating tube about the outer conductor, said outer conductor being a braided cable, said braided cable being split at one end to lay back over and adjacent the insulating tube about said outer conductor a predetermined distance from whence it is returned to comprise a loop adjacent the end of the insulating tube;

a metal ring located in the loop of said outer conductor over said insulating tube; and

a tube means bridging the space between the insulating tube beyond the loop and the connection nut, said tube means being formed and affixed to surfaces of the outer conductor braided cable loop and surfaces of the connection nut that include separate raised areas on their surfaces under the tube means that will with the braided cable surfaces provide increased surface area than a smooth surface for the forming and affixing of the tube means to join outer conductor and connection nut such that the area therebetween is sealed from the environment.

4,026,629

METHOD OF MANUFACTURING AN ELECTRICAL HARNESS AND ELECTRICAL CONNECTORS AND TERMINALS FOR CARRYING OUT THE METHOD

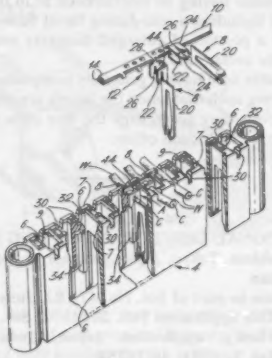
Helen Dechelette, St. Cloud, and Jean Claud Joly, Osny, both of France, assignors to AMP Incorporated, Harrisburg, Pa.

Filed May 4, 1976, Ser. No. 682,924

Claims priority, application France, May 12, 1975, 75.14747; Jan. 15, 1976, 76.00968

Int. Cl.² H01R 9/08

U.S. Cl. 339—97 P **9 Claims**



1. An electrical connector comprising an insulating housing, and a plurality of electrical terminals therefor, the housing having a plurality of terminal-receiving through openings having first and second ends, a wall of the housing being provided with notches each opening into an edge of the wall, the first end of each opening having therein an abutment opposite to such a notch, each terminal being adapted to be received in one of the openings and having a contact portion for mating with a complementary electrical terminal member and a wire connecting portion having means for piercing the insulation of an insulated wire to make electrical contact with the electrically conductive core of the wire, the contact portion and the wire connecting portion of each terminal being disposed opposite to one another with the insulation piercing means of the wire connecting portion directed towards the contact portion, each terminal being dimensioned to be inserted with its contact portion leading, through the first end of the opening to cause a wire laid in the notch associated with such opening to be forced by the abutment against the insulation piercing means of the wire connection portion of the terminal to cause the insulation piercing means to make electrical contact with the electrically conductive core of the wire, with the contact portion of the terminal aligned with the second end of the opening to mate with a complementary terminal member inserted through such second end, each terminal having means for cooperation with the housing to lock the terminal in its inserted position in the opening.

4,026,630

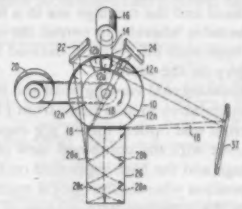
SCANNING APPARATUS USING HOLOGRAPHIC BEAM DEFLECTOR

Hans Peter Wollenmann, Rueti, Switzerland, assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 23, 1975, Ser. No. 644,679

Int. Cl.² G02B 27/17

U.S. Cl. 350—7 **7 Claims**



1. An omnidirectional scanning system for scanning bar coded labels on randomly oriented articles comprising:

an elongated scanning window;

a disk member having a plurality of hologram segments recorded thereon, each of said hologram segments, when reconstructed, producing a point image, each of said reconstructed hologram segments producing different points in a plane which is parallel to the plane containing said hologram segments;

a collimated light source providing a beam of light directed to illuminate a small area of said hologram segments;

means for rotating said disk member about its axis so that each hologram segment on said disk member, when illuminated, produces a reconstructed point image which scans a circular arc;

first optical means fixed in a position to intercept the reconstructed beam from one of said holograms and to reflect the intercepted beam to said scanning window to produce a first scanning segment; and

second optical means fixed in a position to intercept the reconstructed beam from another of said holograms and to reflect the intercepted beam to said scanning window to produce a second scanning segment intersecting the first scanning segment to produce a cross scanning pattern.

4,026,631

IMAGE INTERPRETATION INSTRUMENT

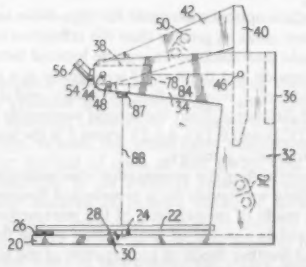
David K. Erb, 235 Forsyth Drive, Waterloo, Ontario, Canada

Filed Mar. 24, 1976, Ser. No. 670,071

Claims priority, application United Kingdom, Apr. 1, 1975, 13169/75

Int. Cl.² G02B 27/22

U.S. Cl. 350—35 **18 Claims**



1. An image interpretation instrument comprising:

a. a viewing head;

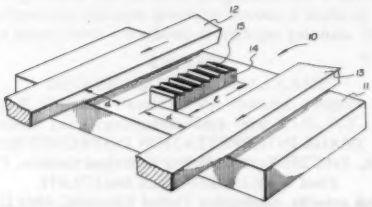
b. an image carriage in spaced relation to said viewing head for supporting imagery to be viewed through the viewing head,
c. a table spaced from the viewing head for supporting a base to be annotated with information derived from the viewing of the imagery supported on the image carriage,
d. said viewing head having optical means adapted to provide an observer with a combined view of the imagery on the carrige and a base supported on the table when the viewing head and the carriage are in a first position relative to the table whereby to permit the observer to annotate the base with information derived from the view of the imagery on the carriage.
e. means mounting said viewing head and image carriage for movement relative to said table from (1) said first position wherein said optical means are capable of providing the observer with the combined view of the imagery on the carriage and the base supported on the table, to (2) a second position wherein the optical means is incapable of providing the observer with a view of the base on the table but remains capable of providing the observer with a view of the imagery on the image carriage, with the second position of the carriage being such as to permit the observer to annotate the imagery on the carriage with information derived from the viewing thereof,
f. and means for positively locating said viewing head and image carriage at either one of said first and second positions.

4,026,632

FREQUENCY SELECTIVE INTERWAVEGUIDE COUPLER

Kenneth O. Hill, and Akira Watanabe, both of Kanata, Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Filed Jan. 7, 1976, Ser. No. 647,102
Int. Cl.² G02B 5/14
U.S. Cl. 350—96 C **7 Claims**



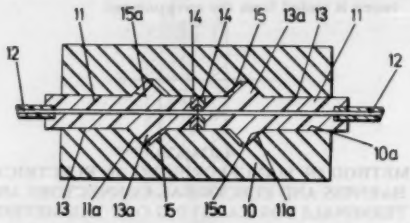
1. A frequency selective optical coupler comprising:
a first optical waveguide having a refractive index n_1;
at least one second optical waveguide having a refractive index n_2;
an intermediate optical waveguide having a finite length and a refractive index n_3 greater than the refractive indices n_1 and n_2, said intermediate waveguide located between the first waveguide and the second waveguide at a predetermined distance d_1 from the first waveguide and at a predetermined distance d_2 from the second waveguide, wherein $0.1\lambda<d_1 2 1\ 2\lambda$ and $0.1\lambda<d_2<2\lambda$ where [is the wavelength of the propagating energy;
means for controlling the propagation characteristics of the intermediate waveguide for a preselected frequency such that one mode of propagation of the intermediate waveguide matches a mode of propagation of the first waveguide and another mode of propagation of the intermediate waveguide matches a mode of propagation of the second waveguide, and for transferring optical energy between the modes in the intermediate waveguide.

4,026,633

OPTICAL FIBER CONNECTOR

Aubrey M. Crick, Epping, England, assignor to International Standard Electric Corporation, New York, N.Y.

Filed May 10, 1976, Ser. No. 685,114
Claims priority, application United Kingdom, June 19, 1975, 26106/75
Int. Cl.² G02B 5/16
U.S. Cl. 350—96 C **5 Claims**



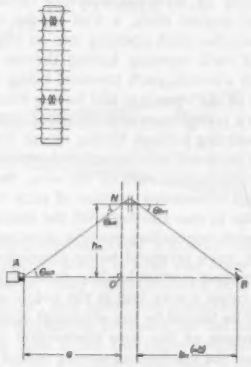
1. An optical fiber demountable connector comprising:
a resilient coupling receptacle having a hole therethrough;
a pair of optical fibers held butted together in end-to-end relationship in said hole;
the butting end of each said fiber being secured inside a terminating collar and terminating at one end thereof with the fiber aligned with the collar axis;
each said collar having an interference fit in the receptacle hole and including a rear-facing bevel between one portion and a portion of enlarged diameter nearer the free end of the collar; and
the receptable hole having generally complementary bevels at a spacing such that when the bevels are engaged by the collar bevels they act to urge the free ends of the collars into contact with each other.

4,026,634

DIRECTIONAL LIGHT TRANSMITTING SCREEN

Yoshio Fukushima, Tokyo, Japan, assignor to Ricoh Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 47,182, June 18, 1970, abandoned. This application Feb. 28, 1972, Ser. No. 229,917
Claims priority, application Japan, June 18, 1969, 44-48475; Mar. 1, 1971, 46-10754
Int. Cl.² G03B 21/60; G02B 5/17
U.S. Cl. 350—128 **9 Claims**



1. A directional light transmitting screen comprising a plurality of adjacently disposed light-refracting systems as screen elements, each of said light-refracting systems having its own refractive power, optical axis, effective center plane, and two

outermost surfaces with optical centers and diameters normal to said optical axis, and each of said systems comprising:

means for focusing parallel light rays incident upon one outermost surface thereof onto the effective center plane of the system, with the parallel ray which passes through the optical center of said one outermost surface directed substantially parallel to the optical axis of the system upon entering and leaving the effective center plane; and

means for causing all of said parallel light rays to emerge from the system through the other outermost surface in parallel, the angle of said emerging parallel rays with the optical axis of the system being determined by the system refractive power and the angle of incidence with respect to the system optical axis of said parallel light rays on said one outermost surface; and

wherein certain of said systems differ from others in refractive power.

4,026,635

INDICATOR FOR DISPLAYING TEXT OR SYMBOLS ON SMALL SURFACES

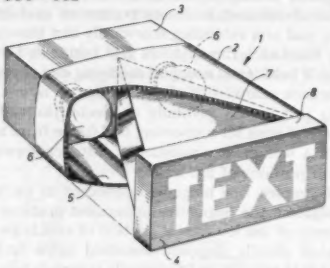
Erland Olof Ingemar Wallin, Stockholm, Sweden, assignor to AB Teleplan, Solna, Sweden

Filed Oct. 7, 1975, Ser. No. 620,470

Claims priority, application Sweden, Oct. 18, 1974, 7413182

Int. Cl.² G02B *17/04*

U.S. Cl. 350—112 **5 Claims**



1. Indicator for displaying text or symbols within a maximum field of view and with maximal intensity and for reducing the reflection of light incident on the indicator to a minimum, comprising a light impervious casing, two light sources, a transparency carrying the text or symbols, and a light conducting insert in the casing, characterized in that the insert is a prism having two plane-parallel triangularly shaped limiting surfaces, one base surface which is positioned directly adjacent to the transparency, and two rectangular surfaces which are entrance surfaces for the light from the light sources, each light source being positioned adjacent to one of said light entrance surfaces, and that the light sources are mounted against a light absorbing background.

4,026,636

STEREOSCOPIC FILMS

Giuliano Cecchini, via dell'Argin Grosso 105, Florence, Italy

Filed Sept. 10, 1975, Ser. No. 611,877

Claims priority, application Italy, Sept. 20, 1974, 11678/74

Int. Cl.² G02B *27/22*

U.S. Cl. 350—135 **3 Claims**

1. A stereoscopic film viewer for viewing successive pairs of stereoscopic film images on corresponding pairs of frames in a length of film having a locating hole associated with each pair of frames to enable accurate location of the frames in a viewing station by the viewer, the viewer comprising:

a housing

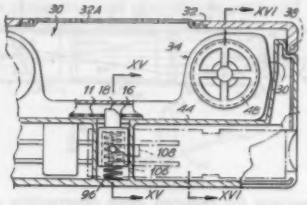
drive means located in the housing for driving the film past the viewing station;

locating means including a finger slidably mounted on the housing;

biassing means positioned between the locating means and the housing for biassing the finger toward the film for engagement with successive said holes to locate and lock each pair of frames in turn in the viewing station;

the drive means including a reciprocatable member having a resilient portion carrying a cam; and

said locating means including a cam follower formed on said



finger and arranged to operatively cooperate with a first camming surface of said cam during a forward stroke of the reciprocatable member to displace said finger out of engagement with a locating hole until said drive means has started to drive the film, and to operatively cooperate with a second camming surface of said cam during the return stroke of the reciprocatable member to deflect the said resilient portion of said reciprocatable member and the said cam supported thereby out of an operational posture with respect to said finger.

4,026,637

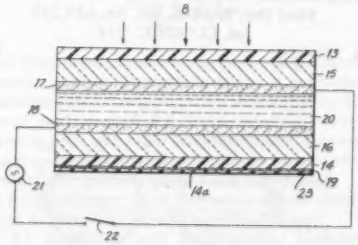
TIMEPIECE DISPLAY DEVICE UTILIZING LIQUID CRYSTALS OF POSITIVE DIELECTRIC ANISOTROPY

Yoshio Yamazaki, Shimosuwa, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Continuation-in-part of Ser. No. 472,749, May 22, 1974, abandoned, which is a continuation-in-part of Ser. No. 184,167, Sept. 27, 1971, Pat. No. 3,816,334. This application Feb. 13, 1976, Ser. No. 658,138

Int. Cl.² G02F *1/13*

U.S. Cl. 350—160 LC **7 Claims**

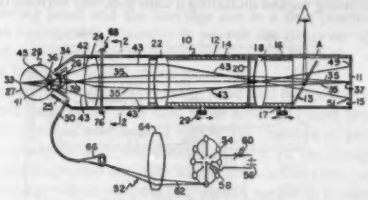


1. A timepiece display device, comprising opposed unidirectionally oriented transparent plates, said plates being so positioned that said orientation directions are perpendicular to each other, at least one transparent conductive electrode on the inner surface of each of said plates, said electrodes being connectable to an external voltage source, nematic liquid crystal material of positive dielectric anisotropy between said plates, a polarizing filter at the exterior face of one of said transparent plates, an analyzing filter at the exterior surface of the other of said transparent plates, said analyzing filter having a rough exterior surface, a reflector exterior to said analyzing filter and contiguous with the rough exterior surface thereof.

4,026,638
REDUCED GLARE SCANNER

Jacques P. Govignon, Malden, Mass., assignor to Varian Associates, Palo Alto, Calif.

Filed Dec. 2, 1974, Ser. No. 528,740
Int. Cl.² A61B 3/14
U.S. Cl. 351—7 30 Claims



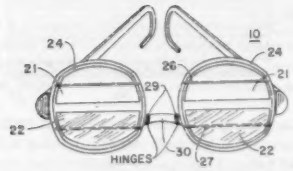
1. Apparatus for reduced glare observation of an article through transparent, reflective and diffusive media comprising, an image receiving means; illumination means which beams light to said article, said media being mounted proximate said article, said light being reflected from said article through said media to said image receiving means; light directing means to direct said light to rapidly and repeatedly illuminate successive portions of said article; an observation diaphragm positioned between at least a portion of said media and said image receiving means, said diaphragm having a moveable aperture for moving in concert with said light directing means so as to rapidly scan the sequentially illuminated portions of said article, the remainder of said diaphragm screening out glare and means for moving said light directing means and said diaphragm aperture in synchronization.

22. The apparatus of claim 9 wherein a multi-lens support is positioned between said first and second fiber patterns and adjacent said illuminating diaphragm, said support having mounted therein a plurality of lenses, each lens being mounted between a pair of spaced opposed fibers to focus the light rays transmitted therebetween.

4,026,639
STEREO VIEWER EYEGLASS FRAME

Donald G. Lebo, Bridgeport, Conn., assignor to The Raymond Lee Organization, Inc., New York, N.Y.

Filed Dec. 9, 1975, Ser. No. 639,212
Int. Cl.² G02C 7/14
U.S. Cl. 351—50 2 Claims



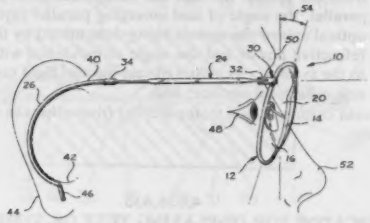
1. An eyeglass frame for providing individual lines of sight for each eye of the wearer comprising

an eyeglass frame formed of two lens frames each pivotally hinged to a bridge, with each frame adjustably linked to a temple piece and with two mirrors pivotably mounted on parallel axes in each lens frame, so that a line of sight may be directed from one mirror and into an eye of the wearer, in which the axis of rotation of each lens frame to the bridge is in the generally vertical plane and the axis of rotation of each mirror to the associated lens frame is in the generally horizontal plane for the worn position of the eyeglass frame.

4,026,640
TENNIS PLAYERS' SPECTACLES

Donald E. Everburg, Southbridge, Mass., assignor to American Optical Corporation, Southbridge, Mass.

Continuation of Ser. No. 573,191, April 30, 1975, abandoned.
This application Aug. 5, 1976, Ser. No. 711,943
Int. Cl.² G02C 5/14, 5/02
U.S. Cl. 351—120 1 Claim



1. A pair of spectacles comprising the combination and particular arrangement of:

a lightweight frame front including a pair of slender lens rims interconnected by a bridge having a lower correspondingly slender and similarly shaped smoothly rounded inverted U-shaped main component and a reinforcing downwardly curved brow bar spaced a substantial distance above said main component of said bridge, a rocking pad arm extending rearwardly and thence downwardly from each rim adjacent said bridge and terminating with a broadened nosepad receiving end at a substantial distance rearwardly of said bridge, a nose-engaging rocking pad loosely pivotally connected to said end of each of said arms for supporting said frame front upon the nose of a wearer at a substantial distance forwardly of adjacent portions of the wearer's face;

a pair of temples, one hingedly connected to each of said rims adjacent the respective uppermost portions thereof oppositely of the lowermost portion of said brow bar, an elongated distally disposed sheathed cable ferruled to each of said temples and terminally reversely bent for use in intimately and comfortably fitting the spectacles to the ears of a wearer; and

said frame front being disposed at an unusually severe pantoscopic tilt of greater than 12° relative to said temples for completely avoiding contact of said front with a wearer's brow and face, excepting the contact made by said rocking pads and cables.

4,026,641
TORIC REFLECTOR DISPLAY

David A. Bosserman, Alexandria, and Charles F. Freeman, Springfield, both of Va., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 30, 1975, Ser. No. 645,501
Int. Cl.² G02B 5/10
U.S. Cl. 350—298 10 Claims

1. A head gear mounted toric reflector display system which forms a wide field of view virtual image in the visual space of an observer, said display system comprising:

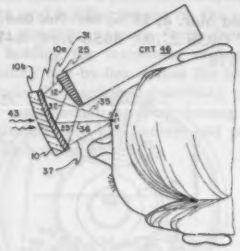
a concave toric reflector in said visual space of an observer, said concave toric reflector having a reflecting surface that is an off-aperture section of a toric reflector having one long radius of curvature and one short radius of curvature for subtending said wide field of view virtual image;

an auxiliary display device which provides information to be viewed by said observer;

a concave toric object surface facing said concave toric

reflector and which approximates said reflecting surface of said concave toric relector; and

an optical transfer device which transfers information from said auxiliary display device to said convex toric object



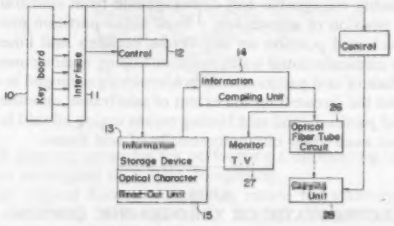
surface as object points of information wherein light from said object points travels directly to said concave toric reflector as diverging beams and are collimated by said concave toric reflector into parallel beams which fill the exit eye pupil of said observer.

4,026,642

IDENTIFICATION CARD ISSUING APPARATUS

Atsuyuki Tanaka, and Masaaki Oyabu, both of Sakai, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jan. 22, 1975, Ser. No. 542,905
Claims priority, application Japan, Jan. 24, 1974, 49-10748
Int. Cl.² G03B 27/00
U.S. Cl. 355—1 **4 Claims**



1. An apparatus for automatically issuing an identification card which comprises, in combination:

information forming means for forming into a video signal information to be ultimately placed on the identification card, said information forming means having an information storage device for electromagnetically storing said information to be ultimately placed on the identification card in the form of coded information, a keyboard arrangement having a plurality of keys corresponding to the contents stored in said information storage device, a control device coupled between said keyboard arrangement and said information storage device for selecting out of the contents stored in said information storage device the desired information by operating some of the keys in said keyboard arrangement, and an information compiling device coupled to said information storage device, and said information compiling device having buffer storage device for compiling all of said coded information selected by said keyboard arrangement from the contents stored in said information storage device into the form of said video signal to be ultimately placed on the identification card;

optical means coupled to said information forming means for converting said video signal into rays of light; and

a transfer-type electrophotographic copying device including a charging means, an exposing station, an image transferring means and a separation means and a photoreceptor drum supported in position for rotation in sequence past said respective means;

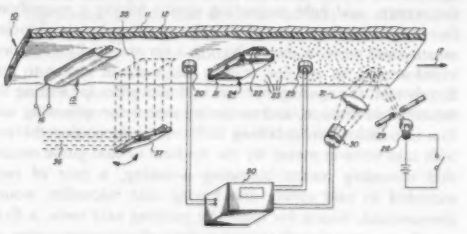
said optical means including an optical fiber tube for coverting said video signal, which is applied thereto from said information compiling device, into rays of light, and a bundle of image transmitting optical fibers positioned between said optical fiber tube and said photoreceptor drum for projecting said rays of light onto said photoreceptor drum at said exposing station.

4,026,643

APPARATUS AND METHOD FOR MEASUREMENT OF THE RATIO OF TONER PARTICLE ELECTROSTATIC CHARGE TO TONER PARTICLE MASS IN ELECTROSTATOGRAPHIC DEVICES

Norman J. Bergman, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Aug. 22, 1975, Ser. No. 606,898
Int. Cl.² G03G 15/00
U.S. Cl. 355—3 DD **12 Claims**



9. In an electrostatographic image processing system of the type wherein a latent electrostatic image is generated on a charge bearing surface and thereafter developed by developing material, said developing material including a toner component and at least one other component, and apparatus for maintaining an electrostatic charge to mass ratio of said toner component within predetermined limits comprising:

means for providing a signal indicative of said electrostatic charge to mass ratio of said toner component;

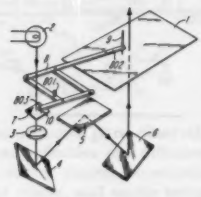
means for comparing said signal to said predetermined limits; and

means for changing the concentration of said toner component in said developing material in response to a change of said charge to mass ratio of said toner component, said signal providing means including means for providing a first signal related to the change in electrostatic potential of said charge bearing surface upon addition of said developing material toner component to said surface, and means for providing a second signal related to the change in optical reflectance from said surface upon addition of said developing material toner component to said surface, said signal providing means including means for combining said first and said second signals to produce said signal indicative of said electrostatic charge to mass ratio of said toner component.

4,026,644
DEVICE FOR INSCRIBING ADDITIONAL INFORMATION ON MICROFILMS

Hiroshi Tsuchida, Tokyo; Makoto Sato, Yokohama, and Shin Hirayama, Tokyo, all of Japan, assignors to Kabushiki Kaisha Hokushin Denki Seisakusho, Tokyo, Japan

Filed Mar. 31, 1975, Ser. No. 563,363
Claims priority, application Japan, Mar. 29, 1974, 49-36213
Int. Cl.² G03B *21/00*; B43L *13/10*
U.S. Cl. 353—44 1 Claim

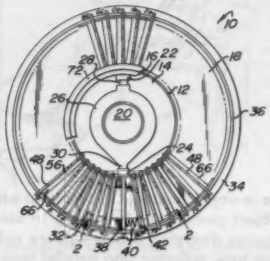


1. A device for inscribing additional information on a microfilm comprising in combination a hollow outer casing, a pantographic scale reducing means mounted on the upper surface of said outer casing, said pantographic means having a scale reducing end and a scale enlarging end and having guide means at the scale enlarging end and write-in means at the scale reducing end, a screen mounted on the upper surface of the outer casing in a position such that said guide means registers therewith, light projecting means within the inside of the hollow outer casing, a light source above said outer casing, said light source and light projecting means being so arranged that the image of a film frame is magnified and projected on the screen, said light projecting means having a magnifying factor equal to the scale reducing factor of said scale reducing means, said write-in means having a tip end and means provided at said tip end for heating said write-in means to uniformly melt the coating layer on said microfilm for writing the information thereon, and mounting means for mounting said film in position for inscribing additional information thereon with said write-in means by the medium of said guide means, said mounting means including a casing, a pair of reels mounted to said casing and having said microfilm wound therearound, means for manually rotating said reels, a fixed member mounted on the upper surface of said outer casing, an elongated film-pressing plate mounted for rotation to said fixed member, said film-pressing plate having one of its ends passing through said casing and the other of its ends formed as two arms defining a recess therebetween, a transparent sheet fitted in said recess, and a pair of film fixing arms made of elastic material and each being secured at its ends to said fixed member, said fixing arms being substantially aligned with said two arms of the film-pressing plate, said upper surface of said outer casing having an opening, said recess being in registry with said opening, the light from the source being transmitted through said recess and opening to the screen through said light projecting means mounted in the inside of said outer casing, the microfilm being guided between the two arms of the film pressing plate and said film-fixing arms and being situated in the light path from said light source to said screen, said film being confronted by said write-in means, means for electromagnetically attracting the write-in means to the surface of the microfilm during write-in operation including an electromagnet mounted on the upper surface of said outer casing, said film-pressing plate being manually depressed at the said one end for allowing the microfilm to pass freely during information retrieval said film pressing plate being released from manual pressure and in position for pressing the film on to the film-fixing arms during write-in operation.

4,026,645
CIRCULAR PHOTOGRAPHIC SLIDE TRAY

Eric B. Bown, Royersford; Harold P. Mueller, III, and Elton Robertson, both of Philadelphia, all of Pa., assignors to Information Design Corporation of America, Philadelphia, Pa.

Filed Mar. 8, 1976, Ser. No. 664,900
Int. Cl.² G03B *23/00*; B65D *1/34*; A47G *19/08*
U.S. Cl. 353—118 6 Claims

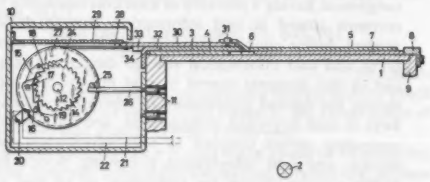


1. A photographic slide projector tray comprising a hub portion to which is connected a circular tray frame, said tray frame including an annular bottom wall and inner and outer circumferential walls upstanding from the corresponding inner and outer peripheral edges of said bottom wall, a plurality of holders releasably positioned in said frame between said inner and outer circumferential walls, each of said holders having spacing means constructed to space each holder from the holders adjacent thereto when said holders are positioned in said frame, whereby slide-holding compartments are formed between adjacent holders, each of said holders and corresponding slides held thereby being adjustable to different positions relative to the other holders on said frame and being releasably engageable and disengageable from said frame in each position of adjustment, a fixed radial partition provided at a selected position on said frame between said inner and outer circumferential walls, resilient biasing means connected to a face of said partition, said holders being arranged in series around the circumferential extent of said frame, on either side of said partition, and said biasing means urging all said holders against each other circumferentially of said frame.

4,026,646
ELECTROSTATIC OR XEROGRAPHIC COPYING OR DUPLICATING MACHINE

Gerhard Ritzerfeld, Schorlemer Allee 14, 1000 Berlin 33, Germany

Filed Jan. 19, 1976, Ser. No. 650,239
Claims priority, application Germany, Sept. 17, 1975, 2541849
Int. Cl.² G03G *15/00*
U.S. Cl. 355—7 30 Claims



1. In combination with an electrostatic or xerographic copying or duplicating machine of the type in which the originals to be copied or duplicated are laid face down upon a transparent support plate to be illuminated by copying light, a transport arrangement for effecting line-by-line transport of a multi-line original in direction transverse to the direction in which the

lines of the multi-line original extend, the transport arrangement comprising an advancement mechanism located at one of the two ends of the transport support plate which extend transverse to the transport direction; a motion-transmitting structure connected to the advancement mechanism and extending from the latter to a position overlying the transparent support plate; and holding means on the end of the motion-transmitting structure remote from the advancement mechanism for holding the transverse end of a multi-line original to be shifted line-by-line across the transparent support plate, wherein the motion-transmitting structure comprises a flexible plate-shaped member having one end connected to the advancement mechanism and provided on its other end with the holding means.

4,026,647

COPY SHEET FEED DEVICE

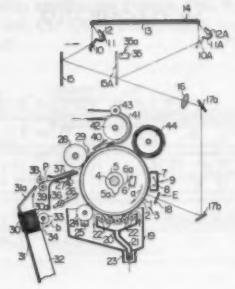
Tadaaki Kanno, Yokosuka, and Yuichi Kobayashi, Yokohama, both of Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 393,341, Aug. 29, 1973, abandoned. This application Jan. 14, 1976, Ser. No. 648,870

Claims priority, application Japan, Sept. 1, 1972, 47-87127

Int. Cl.² G03G *15/28, 15/24*

U.S. Cl. 355—8 **4 Claims**



1. A copying apparatus for performing a duplicating operation on an original document comprising:

a. an original document scanning means for scanning and transmitting an image of an original document to be duplicated, said scanning means comprising movable means for reciprocal movement along a scanning path defined by the limits of image transmission;

b. receptor means for receiving said transmitted image and producing an intermediate image of the original document in response thereto, said receptor means comprising an endless surface moving cyclically along a fixed path continuously at a predetermined rate during the duplicating operation, on which surface said intermediate image is produced;

c. a copy sheet feed means for presenting copy sheets to said surface containing said intermediate image in order to transfer said intermediate image of said original document onto said copy sheets;

d. detection means disposed in a predetermined position along the scanning path of said movable means, for detecting the movement of said movable means past the predetermined position and for producing a detection signal in response thereto; and

e. means for actuating the copy sheet feed means in response to said detection signal; and wherein said predetermined position is set along the scanning path of said movable means such that the detection signal is synchronized to cause said copy sheet feed means to feed the leading end of each copy sheet to said surface in coincidence with the leading end of the intermediate image.

4,026,648

CLEANING DEVICE FOR USE IN ELECTROPHOTOGRAPHIC COPYING APPARATUS

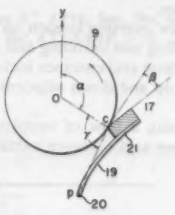
Toru Takahashi, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 315,449, Dec. 15, 1972. This application Jan. 20, 1975, Ser. No. 542,543

Claims priority, application Japan, Dec. 17, 1971, 46-102921; Dec. 20, 1971, 46-103481; Dec. 22, 1971, 46-104339

Int. Cl.² G03G *21/00*

U.S. Cl. 355—15 **12 Claims**



1. Apparatus comprising a movable supporting member having contaminating matter disposed on a surface thereof, and a cleaning device for removing said contamination matter froms said surface, said cleaning device comprising:

an elongated blade of resilient material, said blade having two surfaces meeting to form an extended wiping edge; and

resilient mounting means disposed adjacent said supporting member for maintaining the wiping edge of said blade in pressure contact with said supporting member surface, said resilient mounting means having said blade connected at one end thereof so that one of said two surfaces of said blade generally faces the other end of said mounting means, and so that the other of said two surfaces of said blade generally faces said supporting member and extends from its said contact position in the downstream direction with respect to the direction of movement of said supporting member, said mounting means having its said other end secured at a position located upstream from said contact position of said wiping edge.

4,026,649

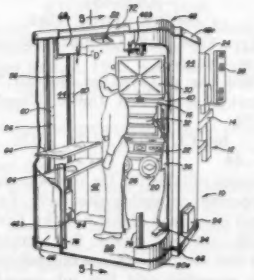
PORTABLE PROCESSING STATION

Charles J. Leonhart, Carol Stream, Ill., assignor to Nuarc Company, Inc., Chicago, Ill.

Filed Nov. 26, 1975, Ser. No. 635,614

Int. Cl.² G03B *27/32*; A47H *3/00*

U.S. Cl. 355—27 **9 Claims**



1. A portable processing station comprising:

an enclosure having a bottom wall, a top wall, a pair of side walls, a rear wall and a front wall defining an entrance

opening, said walls being formed of strong thin sheet material;

integral flange means for joining adjacent edges of said walls forming light tight joints therebetween;

a light tight entrance curtain for opening and closing said entrance;

said entrance curtain comprising a sheet of light tight impervious flexible material rollable on a roller adjacent an upper edge of said entrance opening and including opposite edges slidable within channel means disposed along opposite sides of said entrance opening forming a light tight joint with said front wall when said curtain is in a closed position;

tension means for exerting tension on said curtain, control means for rolling and unrolling said curtain on said roller to open and close said entrance including a flexible member movable up and down adjacent one side of said entrance; and

means for causing a flow of ventilating air through said enclosure when said entrance curtain is closed.

4,026,650

DEVICE TO CORRECT COLOR

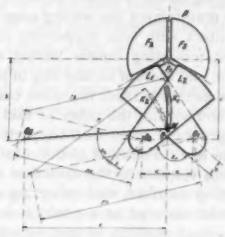
Jan Jasny, Warsaw, Poland, assignor to Centralne Laboratorium Optyki, Warsaw, Poland

Filed Dec. 12, 1974, Ser. No. 532,029

Claims priority, application Poland, Dec. 17, 1973, 167384

Int. Cl.² G03B 27/76

U.S. Cl. 355—36 **11 Claims**



1. A device to correct color, comprising a white light source, means for mixing a white light beam, a condenser and means for focusing the beam on a film stock, a system of three optical filters situated motionless inside said condenser and focusing means, a system of movable leaves stopping down a part of an active field of the filters, and means for changing position of the leaves.

4,026,651

CAMERA STRUCTURE

Constantine Kyro Vitou, 2101 Graham Boulevard West, Montreal, Quebec, Canada

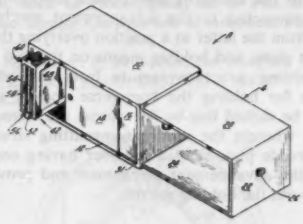
Filed Aug. 4, 1975, Ser. No. 601,743

Claims priority, application United Kingdom, Aug. 14, 1974, 35867/74

Int. Cl.² G03B 13/24, 13/26

U.S. Cl. 355—44 **2 Claims**

1. An apparatus suitable for the reproduction of a positive image, said apparatus consisting essentially of a housing, a lens means mounted in one end of said housing, first shutter means associated with said lens means, first actuating means for actuating said first shutter means, a film sub-assembly, means for adjustably mounting said film sub-assembly within said housing at variable distances from said lens means, said film sub-assembly comprising self-developing film, second shutter means, a focussing plate interposed between said second shutter means and said self-developing film, and second actuating means for actuating said shutter means, and a positive image mounting means, said positive image mounting means



being slidably adjustable in distance with respect to said lens means and said film sub-assembly.

4,026,652

FILM CARRIAGE MECHANISM AND METHOD OF MOVING A FILM LAMINA

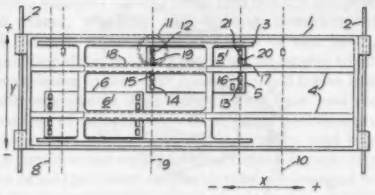
Harry Arthur Hele Spence-Bate, 115 Cheam Plate, Morley, Australia (6062)

Filed May 13, 1975, Ser. No. 576,986

Claims priority, application Australia, May 17, 1974, 7601/74

Int. Cl.² G03B 27/52

U.S. Cl. 355—54 **21 Claims**



1. A film carriage mechanism for moving a film in a camera in an 'X' direction relative to one or more stations, said mechanism including a first frame mounted for movement in one of the said XY directions and a second frame mounted on the first frame for movement in the other of the said XY directions, first platen means including means for holding a film lamina and second platen means adapted for picking up, holding and releasing a film lamina, both platen means being mounted for movement in said other of the said XY directions, and both platen means being mounted on guide means so that at opposite ends of their movement in said other of said XY directions they are aligned at an alignment position on said one of said XY directions, whereby the film lamina may be transferred from one said platen to the other said platen at the alignment position.

4,026,653

PROXIMITY PRINTING METHOD

Jacob Appelbaum, North Plainfield, and Martin Feldman, Murray Hill, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 9, 1975, Ser. No. 576,099

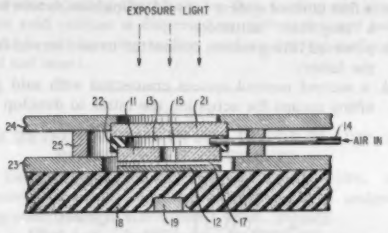
Int. Cl.² G03B 27/02

U.S. Cl. 355—132 **6 Claims**

1. In a process for proximity printing a mask pattern on a photosensitive film, comprising the steps of displacing the mask a small distance from the film and projecting radiant energy through the mask to expose at least part of the film, the improvement wherein:

the displacement step comprises the step of directing air

between the mask and film to force apart the mask and film and establish a uniform and constant gap between the mask and film,

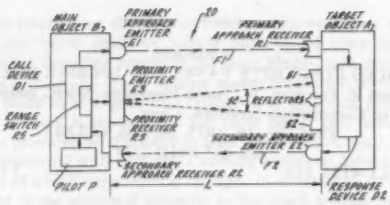


and the air directing step comprises the step of directing air through at least one aperture in the mask toward the film.

4,026,654
SYSTEM FOR DETECTING THE PRESENCE OF A POSSIBLY MOVING OBJECT

Pierre Beaurain, Vitry sur Seine, France, assignor to Engins Matra, Paris, France

Continuation-in-part of Ser. No. 404,700, Oct. 9, 1973, abandoned. This application Sept. 24, 1975, Ser. No. 616,403
Claims priority, application France, Oct. 9, 1972, 72.35731
Int. Cl.² G01C *3/08*; **G01S** *9/66*
U.S. Cl. 356—5 **17 Claims**



1. A high-resolution system for detecting the distance L separating two objects A and B, either or both of which may be in motion, comprising:

approach detector means including approach emitter on object B for radiating toward object A a primary approach signal of a first kind, approach responder means on object A for receiving the primary approach signal and radiating toward object B a secondary approach signal of said first kind, an approach receiver on object B, for receiving the secondary approach signal, and approach comparator means, coupled to the approach emitter and to the approach receiver, for comparing the times of emission of the primary approach signal and reception of the secondary approach signal to determine the distance L within an approach distance range;

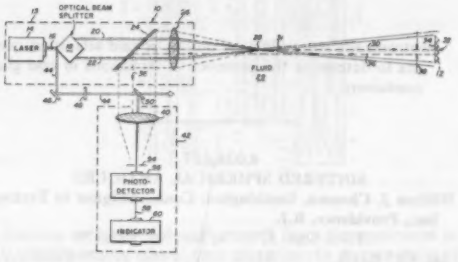
proximity detector means including a proximity emitter on object B for radiating toward object A a primary proximity signal of a second kind different from the approach signals, proximity responder means on object A for receiving the primary proximity radiation signal and radiating toward object B a secondary proximity signal of said second kind, a proximity receiver on object B for receiving the secondary proximity signal, and proximity comparator means, coupled to the proximity emitter and the proximity receiver, for comparing the times of emission of the primary proximity signal and reception of the secondary proximity signal to determine the distance *L* within a proximity distance range encompassing distances smaller than the approach distance range; and

range switch means, coupled to the approach comparator means and the proximity comparator means, for developing an output indicative of distance *L* within a comprehensive distance range encompassing both the approach range and the proximity range.

4,026,655
PSEUDO-BACKSCATTER LASER DOPPLER VELOCIMETER EMPLOYING ANTIPARALLEL-REFLECTOR IN THE FORWARD DIRECTION

William D. Gunter, Jr., San Jose, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed May 27, 1976, Ser. No. 691,046
Int. Cl.² G01P *3/36*
U.S. Cl. 356—28 **11 Claims**



1. A laser Doppler velocimeter for measuring the velocity of a fluid comprising:

first means for providing first and second beams of collimated coherent monochromatic electromagnetic radiation which are focused to intersect at a predetermined location, whereby when said predetermined location is situated in a flowing fluid the movement of the particles of the fluid scatters the radiation in substantially all directions, the scattered radiation having a frequency that is shifted from that of said first beam by an amount corresponding to the velocity of the fluid at said predetermined location;

second means disposed generally forward of said predetermined location being responsive to a portion of the radiation scattered in the forward direction and operative to reflect said portion in a direction substantially antiparallel to said forward direction; and

third means responsive to the frequency of said first beam and to the frequency of said reflected portion of radiation and operative to provide a frequency modulated signal representative of the velocity of the fluid at said predetermined location.

4,026,656
STONE DETECTOR

Maximillian Kusz, Maumee, and Sam Lovalenti, Toledo, both of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed Sept. 2, 1975, Ser. No. 609,325
Int. Cl.² G01N *21/34, 21/32*
U.S. Cl. 356—51 **5 Claims**

1. A method for the inspection of glass containers for the presence of stress inducing inclusions in the sidewalls thereof which comprises the steps of:

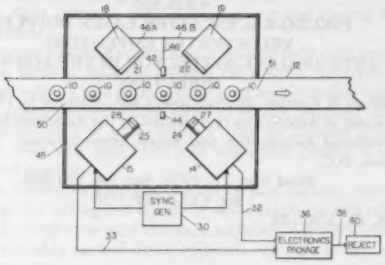
moving said glass containers in a uniformly spaced apart single file through an inspection zone;

illuminating said glass containers in said inspection zone with linearly polarized infra-red radiation having a wavelength greater than 7000 A;

viewing said illuminated glass containers through a polarizing medium, set at 90° with respect to the direction of polarization of said illumination, with a television camera in said inspection zone;

filtering the radiation passing to said television camera to

remove all radiation wavelengths greater than 9500 A; and



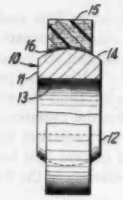
electronically measuring the output of said television camera to determine the presence of inclusions in said glass containers.

4,026,657

SINTERED SPHERICAL ARTICLES

William J. Chmura, Southington, Conn., assignor to Textron, Inc., Providence, R.I.

Filed Sept. 5, 1974, Ser. No. 503,279
Int. Cl.² B21D *53/10*; **B21K** *1/02*; **F16C** *11/06*; **F16D** *1/12*
U.S. Cl. 403—122 **11 Claims**



1. A spherical ball element formed of a sintered porous powder metal blank and characterized by a spherical surface and a bore,

substantially the entire spherical surface of said ball element being further characterized by a mechanically worked wrought-like surface of high

density of at least about 95% of the theoretical density of said metal with the pores at the surface thereof substantially closed,

the density of said spherical ball element in cross-section decreasing from a highly dense zone adjacent said spherical surface to a porous zone of lower density below said dense zone and extending to said bore, the average density of said porous zone ranging from about 70 to less than 95% of the thereotical density of said metal.

4,026,658

AUTOMATIC SUPPORT SYSTEM FOR A SCREED

Arthur August Neuendorf, Big Rock, and Kendall Jay Rudolph, Aurora, both of Ill., assignors to Barber-Greene Company, Aurora, Ill.

Filed July 26, 1974, Ser. No. 492,360
Int. Cl.² E01C *19/00*
U.S. Cl. 404—84 **10 Claims**

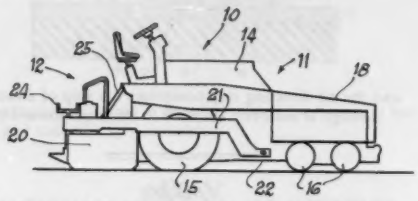
1. In a roadway finishing machine of the type including a tractor and a floating screed, wherein the screed is connected to the tractor by a pair of longitudinally extending draft arms pivotally connected at their forward ends to the tractor such that the screed is towed behind the tractor for self-leveling thereby to form a roadway mat, the improvement comprising:

a. propulsion means for said tractor;

b. a first control system for said propulsion means including a "stop-start" actuator;

c. powered lifting means connected to said screed for lifting the latter;

d. a second control system connected with said powered lifting means for actuating the latter to develop a lifting



force having a magnitude which is at least 80 to 90% of the downward force developed by the dead-weight of the screed; and

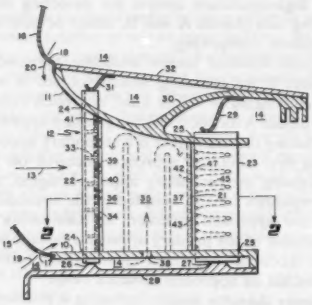
e. automatic actuating means operatively connected with said first and second control systems and responsive to actuation of said stop-start actuator to its stop position thereby to activate said second control system, whereupon said screed is prevented from settling into the mat when forward motion of said tractor is arrested.

4,026,659

COOLED COMPOSITE VANES FOR TURBINE NOZZLES

William R. Freeman, Jr., North Muskegon, Mich., assignor to Avco Corporation, Stratford, Conn.

Filed Oct. 16, 1975, Ser. No. 622,847
Int. Cl.² F01D *5/08*
U.S. Cl. 415—115 **7 Claims**



1. A nozzle for a turbo-machine said nozzle comprising:

an inner shroud;

an outer shroud; and

a plurality of spaced airfoils between said inner and outer shrouds, at least one of said airfoils comprising a core extending between and retaining said inner and outer shrouds, said core having an internal passage running spanwise, one of said shrouds having a cooling air inlet into said internal passage, said core having a cooling air outlet therethrough, al least one replaceable insert fabricated separately of said core and said shrouds and means for retaining said insert between said shrouds in spaced relation to and independently of said core, said insert being wedge shaped and forming a tail for said airfoil, said cooling air outlet comprising orifices through the rear-

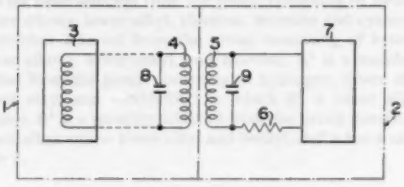
ward wall of said internal passage, said orifices being directed toward said tail insert, and said rearward wall and said tail insert being shaped and positioned relative to each other so as to define between them a cavity and a spanwise opening therefrom so that cooling air issuing from said orifices is dispersed in said cavity and issues through said opening to film cool an exteior surface of said tail insert.

4,026,660

CRACK DETECTING MEANS FOR ROTOR BLADES OF ROTARY WING AIRCRAFTS

Kazuo Ueda, Kagamigahara; Takao Arima, Gifu, and Kazunori Kanayama, Kagamigahara, all of Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Japan

Filed Apr. 13, 1976, Ser. No. 676,496
Claims priority, application Japan, Apr. 15, 1975, 50-45710
Int. Cl.² B64C *27/32*
U.S. Cl. 416—61 **9 Claims**



1. In rotary wing aircrafts including a stationary part and at least one rotor assembly having plurality of rotor blades, means for detecting cracks in the rotor blades, said detecting means comprising crack sensing means associated with each rotor blade so as to provide a change in an electrical property when a crack is produced in the rotor blade, first induction means provided on the rotor at least one for each rotor blade and connected with said crack sensing means to form circuit means of which impedance is changed in accordance with the change in the electrical property in the crack sensing means, second induction means provided on said stationary part of the rotary wing aircraft and adapted to cooperate with said first induction means, means for applying alternating power to one of the first and the second induction means to produce an output signal at the second induction means, means for discriminating the output signal of the second induction means to determine whether there is a crack in the rotor blade.

4,026,661

HYDRAULICALLY OPERATED SUCKER ROD PUMPING SYSTEM

George K. Roeder, Box 4335, Odessa, Tex. 79760

Filed Jan. 29, 1976, Ser. No. 653,284
Int. Cl.² F04B *17/00, 35/02;* **F15B** *7/00;* **B60T** *17/00*
U.S. Cl. 417—53 **13 Claims**

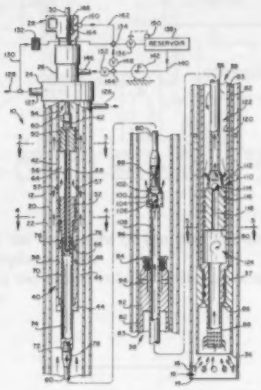
10. In a wellbore having a subsurface pump actuated by a string of sucker rod, and further having a pumpjack unit which reciprocates a polish rod, the method of producing the well comprising the steps of:

dividing a cylindrical chamber into three spaced axially aligned chambers by placing a power piston and a lift piston both independently reciprocable in spaced relationship within the cylindrical chamber;

connecting said polish rod to said upper piston and sealingly engaging said polish rod at the upper end of said upper chamber;

connecting said lift piston to said string of sucker rod by means of a hollow lift rod, and sealingly engaging the lift rod at the lower end of said lower chamber;

connecting a hollow engine power rod to said power piston and slidably receiving the power rod in a reciprocating and sealed manner by said lift piston;



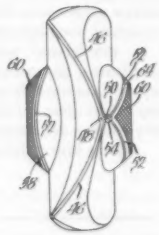
forming an isolated fluid flow path from the uppermost to the lowermost of said three chambers by the provision of a flow path which extends through the power piston, through said power rod, into said lift rod, and into said lower chamber; whereby, movement of said polish rod imparts reciprocal movement into said subsurface pump.

4,026,662

BEARINGS FOR SLANT AXIS ROTARY MECHANISMS

Alexander Goloff, East Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Oct. 23, 1975, Ser. No. 625,226
Int. Cl.² F01C *21/02*
U.S. Cl. 418—53 **6 Claims**



1. In a slant axis rotary mechanism, the combination of:

a housing having a chamber defined by a radially outer spherical wall, a radially inner spherical wall and opposed generally radially extending side walls interconnecting said spherical walls;

a shaft journalled within said housing and having an angularly offset portion within said chamber; and

a rotor having generally spherical hub within said chamber and journalled on said shaft, said rotor hub having raised bearing areas in sliding engagement with said inner spherical surface.

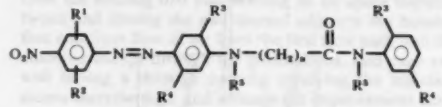
4,026,663

POLYESTER FABRIC DYED WITH MONOAZO DYESTUFFS

Allan M. Huffman, Lock Haven, Pa., and Anatole Wowk, Edison, N.J., assignors to American Color & Chemical Corporation, Charlotte, N.C.

Filed Feb. 5, 1975, Ser. No. 547,268
Int. Cl.² C09B 27/00; D06P 1/02
U.S. Cl. 8—41 C 6 Claims

1. Polyester textile material dyed with a dye of the formula:



in which R^1 is a member selected from the group consisting of hydrogen, lower alkyl, chlorine, bromine, cyano and nitro; R^2 is a member selected from the group consisting of hydrogen, lower alkoxy, lower alkyl, chlorine, bromine and cyano; R^3 is a member selected from the group consisting of hydrogen, lower alkoxy, lower alkyl, and chlorine; R^4 is a member selected from the group consisting of hydrogen, lower alkoxy, lower alkyl and —NHCOR⁶ in which R^6 is lower alkyl or phenyl; R^5 is a member selected from the group consisting of lower alkyl, cyano lower alkyl and benzyl; and n has a value of 1 or 2.

4,026,664

CATALYZED HYDRAZINE COMPOUND CORROSION INHIBITING COMPOSITION CONTAINING A QUINONE COMPOUND AND A COMPLEX OF METAL SALT AND AN ORTHO AROMATIC COMPOUND

Manfred G. Noack, Northford, Conn., assignor to Olin Corporation, New Haven, Conn.

Continuation-in-part of Ser. No. 606,550, Aug. 21, 1975. This application May 24, 1976, Ser. No. 689,229
Int. Cl.² C23F 11/18, 11/14
U.S. Cl. 21—2.7 R 30 Claims

1. A composition, comprising:
a. a hydrazine compound;
b. about 0.002 parts to about 0.04 parts by weight of an organometallic complex per part of hydrazine compound, said organometallic complex being the reaction product of:
i. an inorganic salt selected from the group consisting of cobaltous, manganous, and cupric salts; and
ii. one or more organic ligands selected from the group consisting of unsubstituted and substituted ortho-diamino aromatic compounds, unsubstituted and substituted ortho-dihydroxy aromatic compounds and unsubstituted and substituted ortho-aminohydroxy aromatic compounds; and
c. about 0.001 parts to about 0.05 parts by weight of a quinone compound per part of hydrazine compound.

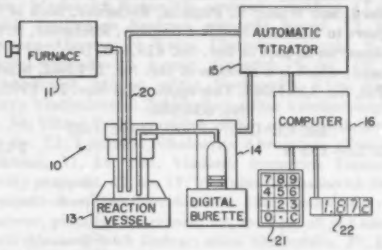
4,026,665

METHOD AND APPARATUS FOR SULFUR ANALYSIS

Ernest Bryant Mansfield, Pittsburgh, and Dennis A. Gibboney, Mount Pleasant, both of Pa., assignors to Fisher Scientific Company, Pittsburgh, Pa.

Filed June 11, 1976, Ser. No. 695,207
Int. Cl.² G01N 31/12, 27/44, 31/06, 31/16
U.S. Cl. 23—230 PC 15 Claims

1. A method for determining the sulfur content of a sample comprising:
A. combusting a sulfur-bearing sample to form a gas sample in which the sulfur is substantially in the form of sulfur dioxide;
B. treating the gas sample with a Lewis base solvent to scrub out the sulfur dioxide by binding it to the Lewis base;
C. titrating the bound sulfur dioxide with a titrant;



D. detecting the end point of the titration and the titrant volume employed; and
E. converting the titrant volume to the amount of sulfur in the sample.

4,026,666

METHOD OF DETERMINING SOY MATERIAL IN FOODS

Leo G. Holmes, Natick, Mass., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 10, 1976, Ser. No. 685,018
Int. Cl.² G01N 33/02, 21/34
U.S. Cl. 23—230 M 10 Claims

1. A method of determining the amount of soy material in a food product which comprises the steps of, (a) dissolving substantially all of the fluorophore-containing component present in said soy material in a sample of said food product of a selected weight in a preselected volume of a solvent for said fluorophore-containing component, (b) separating the insoluble portion of said sample of food product from the solution of said fluorophore-containing component, (c) exposing said solution of fluorophore-containing component to ultraviolet radiation at about 360 nanometers wavelength, (d) determining the maximum fluorescence intensity of said solution of fluorophore-containing component at the wavelength at which maximum fluorescence intensity occurs, and (e) comparing said maximum fluorescence intensity with a standard curve for fluorescence intensity versus quanity of soy material obtained using representative soy materials to determine the quantity of soy material in said sample.

4,026,667

SULFIDE DETECTION DEVICE

Douglas Patton Logan, Coraopolis, Pa., assignor to Calgon Corporation, Pittsburgh, Pa.

Filed Aug. 11, 1976, Ser. No. 713,543
Int. Cl.² G01N 31/22
U.S. Cl. 23—230 R 8 Claims

7. A method of detecting the presence of sulfide or hydrosulfide which comprises contacting a fluid stream with a composition consisting essentially of:
a. 20 to 60 weight percent of a carboxylic acid;
b. 10 to 50 weight percent of a metal salt;
c. 5 to 35 weight percent of a solid wax;
d. 0 to 10 weight percent of a nonionic surfactant; and
e. 0 to 2 weight percent of an oil-soluble dye.

4,026,668

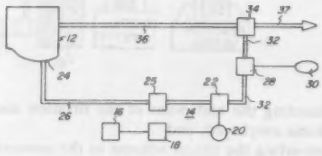
CONTROL APPARATUS FOR SILVER HALIDE EMULSION MAKING

Gerald J. Culhane, Willowdale, Canada; Gary R. Layton, Pittsford, and Walter E. Pittman, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 426,840, Dec. 20, 1973, abandoned, which is a division of Ser. No. 231,842, March 6, 1972, Pat. No. 3,821,002. This application Nov. 24, 1975, Ser. No. 634,806

Int. Cl.² G01N *27/00*; G03C *1/02*

U.S. Cl. 23—253 A **2 Claims**



1. Apparatus for controlling the flow rate of a salt solution into a precipitation vessel of the type used in the preparation of a silver halide emulsion, said apparatus comprising:

a. means for containing a quantity of salt solution and having an outlet and return inlet;

b. first conduit means, connecting said outlet to said return inlet, for providing a closed path outside of said containing means for the salt solution;

c. second conduit means for directing salt solution into a precipitation vessel;

d. valve means, located in the closed path and movable between a first position and a second position, for selectively directing the salt solution from the container outlet to said return inlet or into said second conduit means;

e. means for moving solution from said container through said first conduit means at a predetermined rate;

f. means for sensing the flow rate of said solution through said first conduit means whereby establishment of an equilibrium flow rate can be determined prior to directing said salt solution into the vessel;

g. means for sensing the pAg of the solution within such a precipitation vessel after initial introduction of said salt solution and for producing a signal representative thereof;

h. means for generating a reference signal in accordance with a desired pAg profile; and

i. means for comparing the signal from said sensing means with said reference signal for controlling the flow rate of the salt solution into said vessel subsequent to the initial introduction of said salt solution.

4,026,669

VARIABLE CAPACITY RESERVOIR ASSEMBLY

Ronald James Leonard, Harvard, and Evelyn Miller, Lindenhurst, both of Ill., assignors to Baxter Laboratories, Inc., Deerfield, Ill.

Filed July 14, 1975, Ser. No. 595,901

Int. Cl.² A61M *1/03*, *5/14*

U.S. Cl. 23—258.5 R **3 Claims**

1. A variable capacity blood reservoir assembly for use in blood oxygenator system, which comprises:

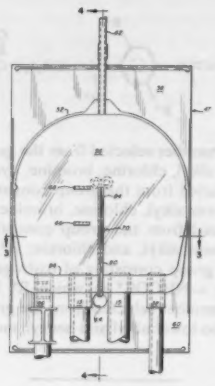
a blood reservoir including a pair of sheet segments in superposed relation, secured together so as to define a blood receiving volume between said sheet segments which define said blood receiving volume being separable in response to blood entering said volume so that said volume is expandable;

a blood inlet on one side of said blood reservoir communicating with said blood receiving volume for directing blood flow into said volume;

a blood outlet on said one side of said blood reservoir communicating with said blood receiving volume for directing blood flow from said volume;

a vent located on the side of the blood reservoir opposite to said one side, said vent communicating with said volume for venting said blood receiving volume to atmosphere;

a pinch clamp slidably positioned on said one side between said blood inlet and said blood outlet and slidable toward said opposite side, for controlling the separation of the sheets so as to control the expansion of said volume;



said pinch clamp including an elongated slidable bifurcated clamp constructed to grasp said sheet segments and maintain said sheet segments in back-to-back contact between said bifurcations; and

said clamp having an elongated back, and a shaped front which includes an upper clamping portion biased toward said back for holding said sheet segments between said clamp back and said clamp upper portion in said back-to-back contact.

4,026,670

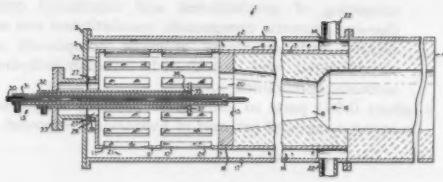
APPARATUS FOR PRODUCING CARBON BLACK

E. Webb Henderson, Oregon, Ohio, assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Apr. 19, 1976, Ser. No. 678,099

Int. Cl.² C09C *1/48*

U.S. Cl. 23—259.5 **8 Claims**



1. An apparatus for producing carbon black, said apparatus including:

a. an elongate housing having first and second ends and a side wall between said ends and having an end wall member substantially closing said first end;

b. a first member positioned in said housing having an upstream end spaced from said first end at a position downstream of said housing end wall, said first member having a longitudinal flow passage therethrough extending from said upstream end to a downstream end and with said flow passage forming a reaction zone;

c. injection means extending into said housing from said

first end and being in general axial alignment with said flow passage, said injection means being operable for introducing fluid into said housing;

d. a cage mounted in said housing between said first end and said upstream end and having a side wall with a plurality of through perforations with the cage side wall being spaced from the side wall of said housing defining a first flow path therebetween with said first flow path communicating with a chamber defined by said cage through said perforations for flow of air from the first flow path into the chamber, said chamber being in communication with said flow passage, said cage having an end wall spaced from the housing first end defining an air space therebetween and closing the end thereof adjacent the housing first end from flow of air from the first flow path into the chamber except through the perforations, said cage end wall having a through opening receiving the injection means therethrough; and wherein the improvement comprises

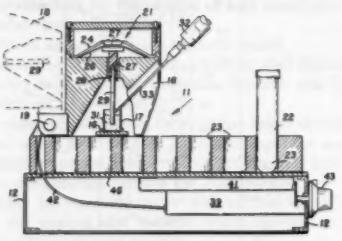
e. seal means cooperating with said cage end wall sealing said opening from flow of air therethrough from the first flow path.

4,026,671

TEST APPARATUS CIRCUIT

Sanford L. Simons, Morrison, and Frederick M. McNeill, Denver, both of Colo., assignors to Sanford L. Simons, Morrison, Colo.

Filed Aug. 2, 1976, Ser. No. 711,038
Int. Cl.² G01N *33/16, 11/16*
U.S. Cl. 23—259 **12 Claims**



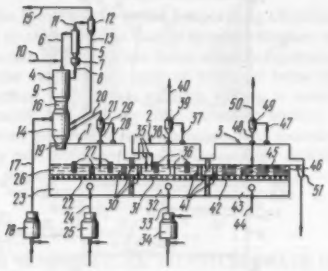
1. A circuit arrangement for test apparatus used to determine properties of fluids comprising an oscillating probe disposed in contact with the fluid to be tested, a source of electric power, electro-mechanical means interconnected to said electric power source to provide a driving force component for mechanically oscillating said probe, said electro-mechanical means being inclusive of co-active conductor and magnet elements that are moved one with respect to the other by the applied driving force and with said probe moving with one of said elements, a sensor circuit connected to said conductor element for sensing a response force signal component generated therein due to relative movement of said conductor with respect to the flux field of said magnet elements, balance circuits for changing the driving force component as necessary to maintain a desired response force, and means providing a signal level readout indication of the changing levels for the driving force component applied as the desired response force is maintained.

4,026,672

PLANT FOR FLUIDIZED BED HEAT TREATMENT OF POWDERED ALUNITE

Nikolai Andreevich Kaluzhsky, Sredny prospekt, 6, kv. 23; Fzitel Markovich Rubinchik, prospekt Maklina, 11, kv. 77; Gakif Zakirovich Nasyrov, prospekt Nauki, 12, kv. 49; German Abramovich Kaim, Ligovsky prospekt, 9, kv. 5; Vitaly Mikhailovich Averin, Gorodok, 8, kv. 19; Savely Mikhailovich Milrud, ulitsa Vavilovykh, 11/6, kv. 130; Garry Vladimirovich Telyatnikov, ulitsa Varshavskaya, 118, kv. 34; Viktor Prokhorovich Lyakhov, ulitsa Ordzhonikidze, 30, kv. 72; Ljudmila Nikolaevna Abramova, ulitsa Kartashikhina, 31, kv. 106; Vladimir Ivanovich Tarasov, Kirovsky prospekt, 42, kv. 11; Vladislav Mikhailovich Denisov, prospekt Kosmonavtov, 92, kv. 136; Dinam Latypovich Nasyrov, prospekt Veteranov, 99, kv. 125, all of Leningrad; Boris Alexandrovich Stolyar, ulitsa Shaumiana, 37, Kirovabad; Muzafar Suleiman-ogly Tagiev, ulitsa Aljuminschikov, 2, kv. 10, Kirovabad; Vladimir Ivanovich Lagno, ulitsa Shaumiana, 1, kv. 8, Kirovabad, and Vladimir Nikolaevich Kostin, Savinskaya naberezhnaya, 3, kv. 82, Moscow, all of U.S.S.R.

Filed Feb. 20, 1976, Ser. No. 659,693
Int. Cl.² B01J *6/00, 8/26, 8/36;* F27B *15/00*
U.S. Cl. 23—262 **5 Claims**



1. A plant for fluidized bed heat treatment of powdered alunite, comprising: a support; a shaft heat exchanger mounted on said support and having a throat subdividing its interior in height into a top and a bottom chamber so that the ratio of the passage cross-sectional areas of a wide and narrow parts falls within a range of from 2 to 12; a cyclone heat exchanger communicating with the top chamber of said shaft heat exchanger via a supply and a descent pipe; an initial alunite feeder connected to said supply pipe; a first cyclone for trapping powdered alunite from gas flowing via a pipe out of said cyclone heat exchanger; a pipe for returning the collected alunite from said first cyclone into the bottom chamber of said shaft heat exchanger; a first means for producing flue gases and for their forced feed into the bottom chamber of said shaft heat exchanger; an apparatus for fluidized bed roasting of alunite mounted on said support and communicating with the bottom chamber of said shaft heat exchanger; a second cyclone for trapping powdered alunite from gas flowing out of said apparatus for fluidized bed roasting of alunite, communicating therewith via a supply and a descent pipe and connected to the bottom chamber of said shaft heat exchanger by means of a discharge pipe; a second means for producing flue gases and for their forced feed into said apparatus for fluidized bed roasting of alunite; an apparatus for fluidized bed reducing of alunite mounted on said support and communicating with said apparatus for fluidized bed roasting of alunite through means for precluding mixing of gaseous components in said roasting and reducing beds; a third means for producing flue gases and for their forced feed into said apparatus for fluidized bed reducing of alunite; a device for supplying reagents into said apparatus for fluidized bed reducing of alunite; a third cyclone for trapping powdered alunite from gases flowing out of said apparatus for fluidized bed reducing of alunite communicating therewith via a supply and a descent

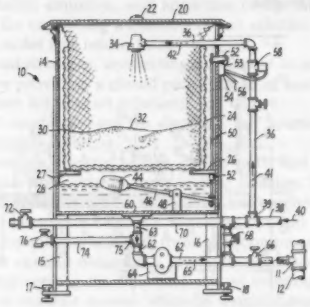
pipe; an apparatus for fluidized bed cooling of reduced alunite mounted on said support and communicating with said apparatus for fluidized bed reducing of alunite through means for precluding mixing of gaseous components in said reducing and cooling beds; a device for forced feed of gas into said apparatus for fluidized bed cooling of reduced alunite; a fourth cyclone for trapping powdered alunite from gas flowing out of said apparatus for fluidized bed cooling of reduced alunite, communicating therewith via a supply and a descent pipe; and outlet means communicating with said apparatus for fluidized bed cooling of reduced alunite for releasing the reduced alunite from the treatment plant for further processing.

4,026,673

APPARATUS FOR DISSOLVING AND DISPENSING FERTILIZER TO EITHER OF TWO WATER STREAMS OF DIFFERENT PRESSURE

Leonard Russo, 177 Canal St., San Rafael, Calif. 94901

Filed May 29, 1975, Ser. No. 581,991
Int. Cl.² B01D *11/02*
U.S. Cl. 23—272 AH **4 Claims**



1. Apparatus for introducing a preselected quantity of soluble fertilizer alternatively into either a first relatively high pressure water stream or a second relatively low pressure water stream in a fully dissolved state, said apparatus comprising:

a tank;

a porous receptacle disposed within the tank and adapted to receive the quantity of soluble fertilizer therein, the bottom of said receptacle being spaced upwardly from the bottom of said tank to provide a plenum volume beneath the receptacle at the bottom of the tank;

a sprinkler head superimposed over the soluble fertilizer in the porous receptacle;

a water supply pipe connected between the second water stream and the sprinkler head for dispensing water in a dispersed state onto the soluble fertilizer in the porous receptacle so that the dispensed water dissolves the fertilizer and passes through the porous receptacle to collect in the plenum volume at the bottom of the tank;

a filter lining in the inner surface of the porous receptacle to prevent passage of undissolved fertilizer through said receptacle;

a float located in the plenum volume to indicate the level of the water containing the dissolved fertilizer at the bottom of the tank;

valve means including a valve interposed in the water supply pipe and means connecting the valve to the float so that the flow of water through the water supply pipe to the sprinkler head is interrupted when the float approaches the bottom of the porous receptacle;

an outlet manifold having an inlet and a first outlet which is connectable to said first water stream and a second outlet which is connectable to said second water stream whereby the water containing the dissolved fertilizer can be alternatively supplied to either water stream;

an outlet pipe having one end connected to the tank at the plenum volume and a second opposite end connected to the inlet of said outlet manifold

a pump interposed in the outlet pipe and adapted to force the water containing the dissolved fertilizer through said outlet pipe; and

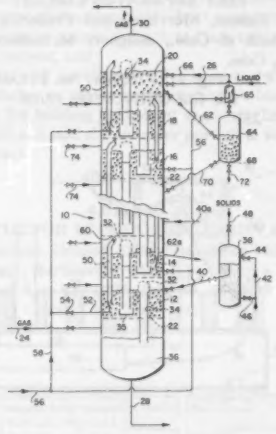
means connected to the outlet pipe upstream of the pump for draining the plenum volume when the apparatus is not in use.

4,026,674

MULTI-STAGE REACTOR

Gerald W. G. McDonald, Summit, N.J., assignor to Commonwealth Oil Refining Co., Inc., New York, N.Y.

Filed Oct. 30, 1975, Ser. No. 627,127
Int. Cl.² B01D *15/02;* **B01J** *8/08;* **C10G** *1/08, 13/14*
U.S. Cl. 23—283 **6 Claims**



1. A multi-stage reactor comprising a plurality of superimposed perforated support plates each supporting a bed of solid particles, means to introduce a liquid phase adjacent to top of said reactor, means to introduce a gas phase adjacent to the bottom of said reactor, means to withdraw liquid from the bottom of the reactor, means to vent gas from the top of the reactor, the perforations in said plates and the rates of gas flow being such as to minimize liquid flow through the plates, overflow means to maintain a liquid level in each bed and to permit excess liquid to flow downwardly to the next lower bed, screen means to prevent solids from the beds from flowing through said overflow means, means to introduce a solid phase at one end of said reactor, means to withdraw the solid phase from the other end of the reactor, and transport means to transport solids from above a respective support plate to the solids bed above the adjacent support plate in the direction of movement of the solid phase.

4,026,675
HEAT EXCHANGER FOR NUCLEAR REACTOR INSTALLATIONS

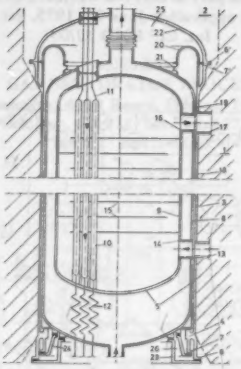
Hans-Dieter Marsch, Dortmund-Oespel, Germany, assignor to Friedrich Uhde GmbH, Dortmund, Germany

Filed June 23, 1975, Ser. No. 589,436

Claims priority, application Germany, July 1, 1974, 24314781

Int. Cl.² B01J *8/06*; **F22B** *1/00*; **F28D** *7/10*; **G21C** *19/28*

U.S. Cl. 23—288 M **5 Claims**



1. Heat exchanger for a cavern-type nuclear reactor comprising

a. a vertically disposed double-walled vessel in which the walls are spaced from each other and provided with an inlet and outlet for the outer vessel space,

b. a plurality of reaction tubes within the inner space of said vessel, said tubes containing a gas-reforming catalyst through which material to be reformed flows,

c. a metallic liner for the outside of said vessel providing an annular space therebetween,

d. a bottom and a top cover for said vessel,

e. catalyst-free inlet and outlet pipes for said reaction tubes entering said vessel through said bottom and top cover respectively,

f. said outlet pipes passing through the lower double-walled vessel space to serve as a heat exchanger for same,

g. vertically spaced inlet and outlet for the inner vessel space constituting recycle gas nozzles, and

h. packing between the outer wall of said vessel and said liner for sealing said annular space against recycle gas flowing through said nozzles.

4,026,676
PROCESS FOR PRODUCING SALT HAVING A REDUCED CALCIUM SULFATE CONTENT

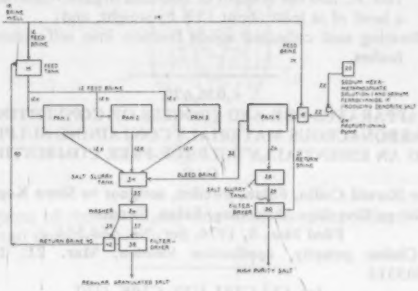
Howard W. Fiedelman, Woodstock, Ill., assignor to Morton-Norwich Products, Inc., Chicago, Ill.

Division of Ser. No. 554,649, March 3, 1975, Pat. No. 3,925,027, which is a division of Ser. No. 480,615, June 19, 1974, Pat. No. 3,891,397, which is a continuation-in-part of Ser. No. 439,289, Feb. 4, 1974, abandoned. This application Aug. 15, 1975, Ser. No. 604,901

Int. Cl.² B01D *9/02*; **C01D** *3/06*, *3/16*

U.S. Cl. 23—298 **6 Claims**

1. A process for preparing dendritic salt of high purity and low calcium sulfate content which process consists of continuously feeding raw sodium chloride brine containing dissolved calcium sulfate in an amount of from about 0.5 to about 5.5 grams per liter and considerable quantities of calcium bicarbonate into an evaporating and crystallizing chamber, concentrating and evaporating said brine at an elevated temperature below about 220° F. and at a reduced pressure in the presence of no more than from about five to 500 parts per million on a saturated brine basis of an alkali metal polyphosphate, adding to said brine an alkali metal ferrocyanide at a rate sufficient to produce a crystalline dendritic salt having a bulk density not exceeding about 59 pounds per cubic foot and containing less than about 13 parts per million of said alkali metal ferrocyanide, concomitantly bleeding brine from said evaporating chamber at a rate such that the maximum calcium sulfate



content the brine reachs in the evaporating chamber is from about 1½ to about 2 times that of its concentration in the raw brine, the rate of feed of raw brine to said evaporating chamber and the concomitant rate of bleed of brine therefrom being adjusted to maintain calcium sulfate in solution, and concomitantly withdrawing solid dendritic sodium chloride crystals from said evaporating chamber, said sodium chloride containing not more than about 30 parts per million of calcium and magnesium combined, expressed as calcium.

4,026,677
HIGH TEMPERATURE TITANIUM BRAZE FOIL

Francis S. Galasso, Manchester; Urban E. Kuntz, East Hartford, and Eugene J. Delgrosso, Wallingford, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Feb. 13, 1975, Ser. No. 549,848

Int. Cl.² B32B *15/00*

U.S. Cl. 428—649 **1 Claim**

1. A composite preform for use in diffusion brazing comprising:

a titanium-zirconium foil;

at least a first layer of nickel coated on at least a first surface of said foil; and

a coating of beryllium formed over said nickel layer, the total preform composition consisting essentially of, by weight, 37–46% titanium, 37–46% zirconium, 2–6% beryllium and 4–24% nickel.

4,026,678
PROCESS FOR TREATING MUNICIPAL WASTES TO PRODUCE A FUEL

Andrew D. Livingston, Independence, Kans., assignor to Guaranty Performance Co., Inc., Independence, Kans.

Filed Dec. 17, 1975, Ser. No. 641,629

Int. Cl.² C10L *5/00*

U.S. Cl. 44—1 D **11 Claims**

1. A process for treating wastes to produce a fuel product therefrom, said process comprising the steps of:

collecting a quantity of solid waste material comprising at least about 15% by weight of organic material capable of being fiberized;

treating said waste material to fiberize at least a portion of said organic material and create a substantially homogeneous pulp-like mixture containing the same and having from about 20% to 70% by weight moisture;

producing an air-fluidized stream of said mixture having a temperature of from about 130° to 180° F. and including a solids fraction having said fiberized material therein, said solids fraction having a moisture content sufficient to enhance the adhesive properties of said fiberized material;

collecting said solids fraction while maintaining said moisture content of said solids fraction, the temperature of the solids fraction within the range of from about 130° to 180° F., and the content of fiberized organic materials at a level of at least about 15% by weight; and

forming said collected solids fraction into self-sustaining bodies.

4,026,679

APPARATUS FOR AND PROCESS OF CONVERTING CARBONACEOUS MATERIALS CONTAINING SULPHUR TO AN ESSENTIALLY SULPHUR-FREE COMBUSTIBLE GAS

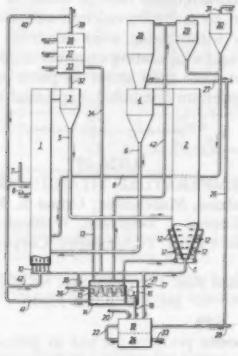
Per Harald Collin, Falun, Sweden, assignor to Stora Kopparbergs Bergslags Aktiebolag, Falun, Sweden

Filed Mar. 8, 1976, Ser. No. 664,514

Claims priority, application Sweden, Mar. 21, 1975, 7503313

Int. Cl.² C10J *3/20*; C10K *1/20*

U.S. Cl. 48—73 **7 Claims**



1. An apparatus for carrying out the process for the conversion of carbonaceous materials containing sulphur to an essentially sulphur-free combustible gas by gasification at an increased temperature including gasification vertical refractory-lined furnace shafts each of which are interconnected to means for separating of solids and gases, a first plurality of nozzle means and inlet pipe means for supplying carbonaceous materials, steam, and CaO-containing material to the first shaft, conduit means for separating gases and solids of the first shaft to the second shaft, second conduit means for removing a fractional stream of solid materials from said means for separating solids and gases of said first shaft interconnected for separating from said fractional stream ashes and sulphur, third conduit means for returning said ash and sulphur free purified materials separated from said means for separating of solids and gases to said first shaft, fourth conduit means for transferring the remainding stream of solid materials to the second shaft, fifth conduit means for returning solid materials exposed to overtemperature from the second shaft to the first shaft so as to satisfy the heat requirement for the gasification therein, a second plurality of nozzle means for supplying steam and gas containing molecular oxygen to the second shaft for partial combustion with said remainding stream of solid materials, sixth conduit means for removing combustible nitrogen-free gases from the first shaft, and seventh conduit means for removing combustible nitrogen containing gases from the second shaft, said combustible gases being removed from the shafts and being essentially free of sulfur.

4,026,680

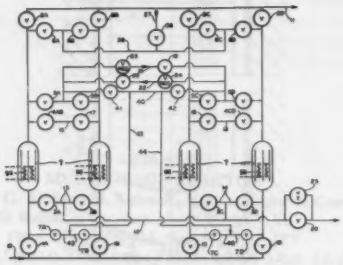
AIR SEPARATION BY ADSORPTION

John J. Collins, Katonah, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 519,267, Oct. 30, 1974, abandoned. This application June 20, 1975, Ser. No. 588,821

Int. Cl.² B01D *53/04*

U.S. Cl. 55—26 **12 Claims**

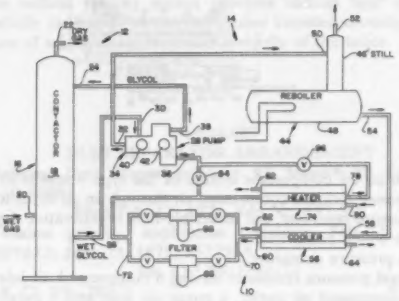


1. In an adiabatic pressure swing process for air separation by selectively adsorbing at least nitrogen alternately in at least two thermally isolated crystalline zeolitic molecular sieve adsortion beds of at least four Angstroms apparent pore size at ambient temperature by introducing feed air to the inlet end of a first adsorption bed at high pressure, discharging at least 60% oxygen from the discharge end, cocurrently depressurizing said first bed and terminating such cocurrent depressurization when the first bed is at lower pressure, and returning part of such oxygen from the cocurrent depressurization for repressurizaton of another purged adsorption bed, releasing waste gas from the first bed inlet end thereby countercurrently depressurizing same to a lowest pressure, introducing oxygen gas from another adsorption bed discharge end to the first bed discharge end as purge gas for desorption of the nitrogen adsorbate and discharging the adsorbate-containing purge gas from the first bed inlet end as waste gas, introducing oxygen gas from the discharge end of an other-than-first adsorption bed and at above said lowest pressure to the purged first bed for at least partial repressurization thereof, with the aforedescribed gas flows being such that a depressed temperature section is formed in the first bed inlet end wherein the coldest gas temperature is no warmer than 35° F and the temperature difference between said coldest gas temperature and a warmest gas temperature within the first bed is at least 50° F: the improvement comprising transferring heat to said inlet end by metal solid conduction from both the adsorbent inlet and the bed section downstream the inlet end at rate sufficient to maintain the gas flowing therethrough at temperature at least 20° F warmer than such gas without such metal solid conduction heat transfer but less than 110° F.

9. In adiabatic pressure swing apparatus for air separation by selective adsorption of nitrogen comprising at least two thermally isolated zeolitic molecular sieve adsorbent beds of at least four Angstroms apparent pore size and at least 12 inches effective diameter circular cross-section, being arranged and conducted for alternate flow of feed air to the inlet end of each adsorbent bed at high pressure and discharge of at least 60% oxygen from the discharge end thereof: the improvement comprising a multiplicity of metallic elements in the form of aluminum 1/32 to 1/4 inch thick plates parallel to each other and equally spaced at 1½ to 8 inch intervals across

the adsorbent bed cross-section and extending from the inlet of each adsorbent bed at least one-third the distance toward said discharge end having a total cross-sectional area A of $(X/K)(L/8)^2$ where L is the adsorbent bed length (in feet), K is the thermal conductivity of said metallic elements (in BTU/hr. ft.^{2} °F/ft.), and X is the product KA for an 8 foot long adsorbent bed with values between 0.5 and 12, said metallic elements also being spaced across the adsorbent cross-sectional area such that the distance between each adsorbent particle and the closest metallic element is less than 7 inches.

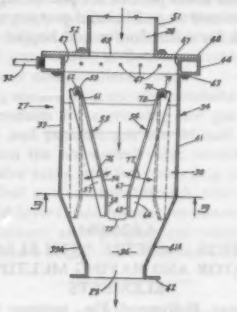
4,026,681
GAS DEHYDRATOR PROCESS
Thomas J. Roskelley, 4000 Rasco, Odessa, Tex. 79762
Filed Dec. 4, 1975, Ser. No. 637,513
Int. Cl.^{2} B01D *53/02*
U.S. Cl. 55—32 **9 Claims**



1. Method of desalting a gas dehydrator system wherein salty wet gas is scrubbed in a contacting tower with a drying agent to remove moisture and salt therefrom comprising the steps of:
1. removing salt water from the salty moist gas by contacting the salty wet gas with a dehydrating agent;
2. removing the water from the salty wet agent by flowing the salty wet agent into a distillation unit and effecting a separation between the water and the agent, thereby leaving a salt containing agent;
3. reducing the temperature of the salt laden agent to a value to cause crystallization of some of the salt to occur;
4. filtering the crystallized salt from the agent; and,
5. pumping the desalted agent back into the contacting tower.

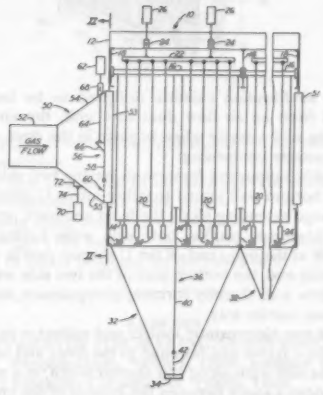
4,026,682
METHOD OF CHANGING THE LENGTH OF A VENTURI THROAT
Josef Pausch, Minnetonka, Minn., assignor to General Resource Corporation, Hopkins, Minn.
Division of Ser. No. 413,786, Nov. 8, 1973, Pat. No. 3,894,563.
This application Feb. 3, 1975, Ser. No. 546,539
Int. Cl.^{2} B01D *47/10*
U.S. Cl. 55—84 **16 Claims**

1. A method of adjusting the area of a Venturi throat comprising: providing a Venturi apparatus including adjusting means and a housing having end walls and fixed converging side walls forming a Venturi throat that has a length longer than its width, said side walls forming the length of the Venturi throat, and moving the adjusting means relative to said end walls to change the length of the Venturi throat while the



positions of the converging side walls and the width of the Venturi throat remain fixed.

4,026,683
INLET DUCT AND HOPPER APPARATUS FOR ELECTROSTATIC PRECIPITATORS
Earle Stuart Snader, Pasadena, and John Leo McKewen, Cockeysville, both of Md., assignors to Environmental Elements Corporation, Baltimore, Md.
Filed Nov. 20, 1975, Ser. No. 633,571
Int. Cl.^{2} B03C *3/76, 3/88*
U.S. Cl. 55—108 **8 Claims**



1. An improved electrostatic precipator apparatus for cleaning a particle-laden gas flowing therethrough of the type comprising in combination:
shell means having a gas inlet duct means and a gas outlet duct means and defining a gas chamber therein;
a plurality of spaced collector electrode plate means suspended within said shell means and defining gas passages therebetween;
a plurality of discharge electrode wire means suspended within said gas passages for ionizing particles in said gas for collection on said collector electrode means; and
hopper means secured below said shell means for collecting particles dislodged from said collector electrode means;
wherein the improvement comprises said gas inlet duct means having a gas flow transition section of which at least a sloped bottom portion thereof extends downward from a supply duct portion to the inlet side of said shell means and also having a gas distribution baffle means

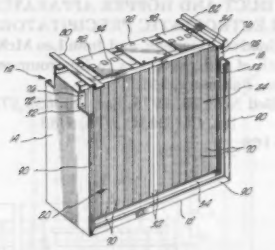
within said transition section for controlling the distribution of said particle-laden gas entering said precipitator, said baffle means including a rigid pervious upper portion and a flexible lower portion for permitting particles accumulating on said sloped bottom portion to slide into said shell means for collection in said hopper means.

4,026,684

AIR FILTRATION CASSETTE WITH ELECTROSTATIC PRECIPITATOR AND HAVING MULTIPLE FILTER ELEMENTS

Richard H. Finger, Hollywood, Fla., assignor to Klykon, Inc., Miami, Fla.

Filed Sept. 15, 1975, Ser. No. 613,364
Int. Cl.² B03C *3/01*
U.S. Cl. 55—126 **5 Claims**



1. An air-filtration cassette designed to be inserted and removed from an air-flow duct as a unit, the air-flow duct supporting said cassette when in place in the duct, said air-filtration cassette comprising:

a metallic supporting framework having two side walls and one bottom wall joined together into a U-shaped profile, a flange extending along the front and back perimeters of the U-shaped profile, both side walls having a shorter width at the open end of the U-shaped profile than at the bottom end, the bottom part of the two side walls and the bottom wall thereby forming an upstream and a downstream carrier tray;

at least one electrostatic ionizer and collector cell mounted within a frame and fastened to the front and back flanges of the side walls along this shorter width, in a manner that provides a space between the bottom of the collector cell and the bottom wall of said framework;

a pre-filtering element having substantially the same filtering surface as the cross section of said supporting framework, said pre-filtering element being supported on one side of said electrostatic cell by the upstream carrier tray of said supporting framework;

a post-filtering element having substantially the same filtering surface as the cross section of said supporting framework, said post-filtering element being supported on the other side of said electrostatic cell by the downstream carrier tray of said supporting framework; and

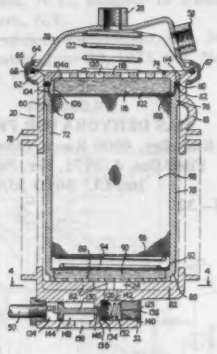
at least a pair of angle guides removably fastened to the top of said electrostatic cell parallel to the sides of said supporting framework at the open end of its U-shaped profile, said angle guides extending over and holding said pre-filtering and post-filtering elements into their respective carrier trays, the entire air-filtration cassette being fastened to and supported by the air-flow duct through said guides.

4,026,685

FLOW REVERSING REGENERATIVE AIR DRYER

Arthur R. Grix, St. Louis County, Mo., assignor to Wagner Electric Corporation, Parsippany, N.J.

Filed Dec. 16, 1975, Ser. No. 641,248
Int. Cl.² B01D *46/00*
U.S. Cl. 55—213 **5 Claims**



1. In an air compressor system of the type wherein an air compressor delivers compressed air through an air dryer to an air pressure reservoir, the reversible-flow regenerative drying system which comprises:

a. a pressure container;

b. said pressure container having a compressed air inlet, a compressed air outlet, a purge air inlet and a purge air outlet;

c. an inner container having sorbent material therein within said pressure container, said inner container being substantially coaxial to and spaced from said pressure container whereby an air space is provided therebetween;

d. means for sealing one end of said inner container to said pressure container intermediate said compressed air inlet and outlet;

e. the ends of said inner container having means for allowing the passage of air therethrough;

f. the purge air inlet adjacent to said compressed outlet;

g. said purge air outlet being at the end remote from said purge air inlet whereby purge air is enabled to flow through said sorbent material in a direction the reverse of the flow of the compressed air; h. valve means for opening said purge air outlet; and

i. a unidirectional valve interposed between said compressed air outlet and said air pressure reservoir.

4,026,686

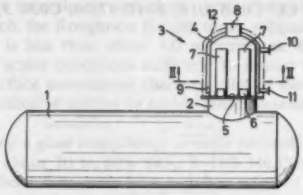
VACUUM FILTER FOR THE PURIFICATION OF GASEOUS MATERIALS

Wilhelm Lödige, Elsenerstrasse 9c; Fritz Lödige, Leuschnerstrasse 12, and Josef Lücke, Im Lohfeld 15, all of, D-479 Paderborn, Germany

Filed Apr. 25, 1975, Ser. No. 571,698
Claims priority, application Germany, May 11, 1974, 2422906
Int. Cl.² B01D *53/00*
U.S. Cl. 55—269 **3 Claims**

3. A vacuum filter for separating solid particles from gaseous materials which comprise condensable substances, comprising a housing, a double jacket radiant heater surrounding said housing for heating and insulating the same, a plurality of filter tubes mounted in spaced relation in said housing, said

filter tubes being spaced from the wall of said housing by a distance equal to at least half their diameter and being arranged generally in a circle, gas inlet means for directing said gaseous material into said housing exteriorly of said filter tubes and thereafter flowing into the interior of said filter tubes, means for removing the filtered gas from said housing,



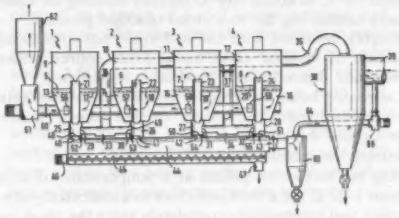
a radiant heater positioned substantially in the center of said housing and spaced from said filter tubes, and radiant heating means positioned in the interior of each filter tube whereby the radiant heating means provides radiant heat directed radially outwardly of the filter tubes countercurrently to the flow of said gaseous materials inwardly of the tubes.

4,026,687

DUST SEPARATOR ARRANGEMENT

Wolfgang Berz, Mauerkircherstr. 13, Munich 80, Germany (D-8000)

Filed Feb. 12, 1976, Ser. No. 657,556
Claims priority, application Germany, Feb. 21, 1975, 2507622; June 23, 1975, 2527918
Int. Cl.² B01D *46/30*
U.S. Cl. 55—288 **9 Claims**



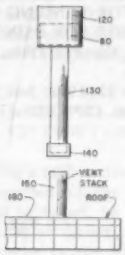
1. A dust separator arrangement comprising:
a. a plurality of filter chambers bounding respective cavities therein;
b. a layer of filter medium dividing each cavity into an upper compartment and a lower compartment;
c. a tubular member positioned in each filter chamber, each member having an upper orifice and a lower orifice,
1. said upper orifice being open toward the upper compartment of each filter chamber,
2. said member extending downwardly from said upper compartment through the layer of filter medium in each filter chamber;
d. a plurality of valve means attached to said tubular members respectively, each valve means including
1. a valve chamber communicating with said lower orifice of the attached tubular member,
2. a first valve seat and a second valve seat on said valve chamber defining respective openings of the same,
3. a valve member movably mounted in said valve chamber, and
4. drive means for moving said valve member between respective positions of engagement with said valve seats in which the valve member blocks the openings defined by the respective engaged valve seats;
e. a raw gas conduit in flow communication with the openings defined by each of said first valve seats;
f. a purging gas conduit in flow communication with the openings defined by each of said second valve seats;
g. a purified gas conduit in flow communication with each of said lower compartments; and
h. conveying means respectively communicating with each of said conduits for conveying raw gas into said valve chambers and purified gas out of said lower compartments when the associated valve members engage said second valve seats, and for conveying purified gas from said purified gas conduit through said lower compartments, said layers, said tubular members, and out of said valve chambers as a purging gas when the associated valve members engage said first valve seats.

4,026,688

EXHAUST VENT FILTER

Ray Patterson, Naples, Fla., assignor to The Raymond Lee Organization, Inc., New York, N.Y.

Filed June 4, 1976, Ser. No. 692,679
Int. Cl.² B01D *46/42*
U.S. Cl. 55—309 **3 Claims**



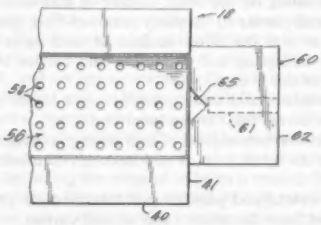
1. An exhaust vent filter, mountable on an existing vent stack, comprising:
a stack pipe connected to the existing vent stack,
a hood mounted on the stack pipe,
a retaining collar mounted in the hood,
a relief vent (70) mounted in the retaining collar, and
a stack of filters mounted on the relief vent.

4,026,689

APPARATUS FOR MAKING GLASS FIBERS

James M. Higginbotham, Newark, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Oct. 1, 1975, Ser. No. 618,715
Int. Cl.² C03B *37/02*
U.S. Cl. 65—1 **14 Claims**



1. A feeder for delivering streams of molten mineral material for attenuation into filaments comprising:

an electrically conductive bottom wall having orifices formed therein through which molten mineral material is delivered as streams for attenuation into fibers;

electrically conductive side and end walls joined to the bottom wall to form a receptacle for molten material;

molten material conditioning means disposed within the feeder, the conditioning means being substantially parallel to the plane of the bottom wall; and,

an electricaly conductive terminal positioned on the exterior surface of each of the end walls, each of the terminals including an inner portion and an outer portion, the inner portion being attached to the end walls at the location of the molten material conditioning means and being substantially parallel to the plane of the bottom wall, the outer portion being in spaced apart relationship from the end walls, the upper extremity of the outer portion being in contact with the lower surface of the inner portion, the outer portion extending from the lower surface of the inner portion towards the bottom wall in a direction substantially normal to the plane of the inner portion.

4,026,690

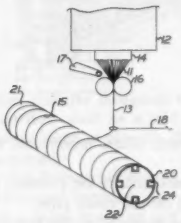
FORMING TUBE FOR WINDING GLASS FIBERS AND METHOD FOR USING SAME

Walter L. McClellan, Minerva, Ohio, assignor to J.C. Baxter Co., Minerva, Ohio

Filed June 22, 1976, Ser. No. 698,748

Int. Cl.[2] C03B *37/02*

U.S. Cl. 65—2 **10 Claims**



1. A strong, flexible glass fiber carrier of a helically wound forming tube construction for supporting glass fiber thereon in generally circular windings during glass fiber processing and having good wet strength and resistance to heat and centrifugal forces, said carrier comprising

a helically wound inner ply having a spiral joint,

at least one helically wound intermediate ply having a spiral overlapped joint,

a helically wound outer ply having a spiral overlapped joint and an outer surface, and

a release coating on the outer surface of said outer ply to enable said carrier to be easily removed from glass fiber wound around the outer surface of said outer ply by partially collapsing and extracting said carrier from the interior of the fiber,

said intermediate and outer plies having a water-resistant adhesive across their entire inner surfaces,

the spiral overlapped joint of said outer ply being stacked above the spiral joint of said inner ply to reinforce the latter,

the spiral overlapped joint of said intermediate ply being staggered from the other joints of said carrier,

each of said helically wound plies being formed of kraft paper selected from the range of 40 to 80 pounds, and

said carrier having a wall thickness selected from a range of 0.020 to 0.060 inches and a diameter of at least 6 inches.

4,026,691

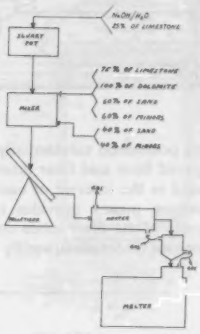
MAKING A PELLETIZED GLASS BATCH FOR SODA-LIME GLASS MANUFACTURE

Joe Bryant Lovett, Sweeny, and James Hinton Dickerson, Jr., Lake Jackson, both of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Nov. 3, 1975, Ser. No. 628,037

Int. Cl.[2] C03B *5/16;* **B01D** *47/06;* **C03C** *3/04*

U.S. Cl. 65—27 **16 Claims**



1. A process for preparing a pelletized glass batch material suitable for soda-lime glass manufacture, said process comprising the sequential steps of

reacting molten, concentrated, aqueous alkali metal hydroxide with an alkaline earth metal oxide source material by admixing them at a temperature in the range of about 80° C to about 160° C thereby forming an aqueous slurry containing the so-formed reaction product,

thoroughly admixing with the so-formed aqueous slurry, a mixture of alkaline earth metal oxide source material, silica, and desired minor processing ingredients,

said admixing being done under conditions to substantially assure thorough distribution of the slurry materials throughout the mixture,

pelletizing the mixture, and

heating the so-formed pellets at a temperature of at least about 145° C for a time sufficient to substantially dry the pellets and substantially completely react the alkali metal hydroxide.

4,026,692

PRESS MOLDING OPTICAL ARTICLES FROM ACID HYDRATED GLASSES

Roger F. Bartholomew, Painted Post, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Dec. 15, 1975, Ser. No. 640,735

Int. Cl.[2] C03C *15/00;* **C03B** *9/14*

U.S. Cl. 65—30 R **22 Claims**

1. A method of making an optical article comprising the steps of:

a. forming a glass comprising, in mole percent on an oxide basis, about 70 to 80% SiO_2, 8–18% Na_2O and/or K_2O, and about 5 to 10% of a member selected from PbO, ZnO, and mixtures thereof;

b. hydrating the glass under acidic conditions to include in the glass a water content from 3% to 12% by weight thereby resulting in an undesirable alkali concentration gradient in the glass from the surface inwardly

c. reacting the hydrated glass of step (b) with an HF-containing solution under conditions sufficient to remove

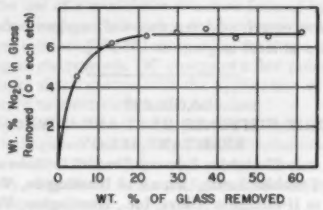
alkali concentration gradients resulting from step (b) in the glass by removing up to 30 weight percent of the glass;

d. dehydrating the glass, if necessary, to reduce the water content to a range of 3 to 7 weight percent; and

e. pressure molding the glass at a temperature ranging from about 250° to 450° C. and at a pressure ranging from about 5,000 to 13,000 psi against a die having a molding surface smoothness such that, over a distance of at least 0.1 inch, the Roughness Height, on an arithmetic average basis, is less than about 3.0 microinches, the molding being under conditions sufficient to impart to the glass the surface smoothness characteristics of the die.

13. A method of making an optical lens comprising the steps of:

a. forming a glass comprising, in mole percent on an oxide basis, about 70 to 80% SiO_2, 8–18% Na_2O and/or K_2O, and about 5 to 10% of a member selected from PbO, $ZnO_,$, and mixtures thereof;



b. hydrating the glass under acidic conditions to include in the glass a water content from 3% to 12% by weight thereby resulting in an undesirable alkali concentraton gradient in the glass from the surface inwardly;

c. reacting the hydrated glass of step (b) with an HF-containing solution under conditions sufficient to remove alkali concentration gradients resulting from step (b) in the glass by removing up to 30 wt.% of the glass;

d. dehydrating the glass, if necessary, to reduce the water content to a range of 3 to 7 weight percent; and

e. pressure molding the glass at a temperature ranging from about 250° to 450° C. and at a pressure ranging from about 5,000 to 13,000 psi between die surfaces, each having a molding surface smoothness such that, over a distance of at least 0.1 inch, the Roughness Height, on an arithmetic average basis, is less than about 3.0 microinches, the molding being under conditions sufficient to form a glass lens having surface smoothness characteristics substantially similar to the die surfaces.

4,026,693

METHOD FOR PRODUCING AN IMAGE DISSECTOR

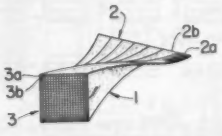
Eiichi Sato, Tama, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Feb. 14, 1975, Ser. No. 550,037

Claims priority, application Japan, Feb. 16, 1974, 49-18150; Mar. 2, 1974, 49-23755

Int. Cl.² C03C *15/00;* **G02B** *5/14;* **C03C** *23/20*

U.S. Cl. 65—31 **9 Claims**



1. A method of producing an image dissector comprising the steps of:

a. providing a single rectangular cross-section glass rod having a core of optical fiber with a thin layer of acid-soluble glass adjacent only one side surface on only two opposite surfaces thereof, and thermally forming the thus-coated glass rod using a heating element;

b. arranging a plurality of the formed glass rods of step (a) in a matrix configuration to form an optical conduit by placing the acid-soluble glass coated side surface of each of said individual coated rods in parallel planes with respect to each other;

c. thermally forming the matrix configuration of rods of step (b) using a heating element thereby fusing the rectangular rods together into a unitary body;

d. shielding one end of the fused body of step (c) with an acid resistant material, then dissolving and removing the thin layers of said soluble glass by subjecting the fused, shielded body to an acid solution, and separating the acid-treated portion of the conduit into a plurality of ribbon-shaped layers having the adjacent uncoated glass rod surfaces fused to each other; and

e. selectively arranging the ends of the layers of step (d) in a straight line which corresponds to the arrangement in the matrix end of the body and binding the thus arranged layers to each other forming an image dissector having one end in a straight line configuration and the other end thereof in a matrix configuration.

4,026,694

STABILIZED DISPERSIONS OF MICRONUTRIENTS IN SPRAY OILS

Edward A. Cross, Houston, Tex., and John D. Downer, Pointe-a-Pierre, Trinidad And Tobago, assignors to Texaco Inc., New York, N.Y.

Division of Ser. No. 528,967, Dec. 2, 1974, Pat. No. 3,982,920. This application Apr. 23, 1976, Ser. No. 679,532

Int. Cl.² C05F *11/00*

U.S. Cl. 71—11 **2 Claims**

1. Process for preparing a micronutrient composition comprising forming a dispersed charge comprising a non-phytotoxic horticultural spray oil, an emulsifier, water an inorganic micronutrient salt of calcium, copper, molybdenum, manganese, zinc, magnesium, or iron and feeding said charge under reduced pressure to the inner tube of climbing film evaporator surrounded by a jacket containing pressurized steam, boiling off the water from said charge from the top of said inner tube and collecting a product consisting of a slurry of said micronutrient salt containing said oil and said emulsifier.

4,026,695

PARTICULATE MULTICOMPONENT SOIL ADDITIVE

Donald C. Young, Fullerton, Calif., assignor to Union Oil Company of California, Brea, Calif.

Filed Feb. 24, 1975, Ser. No. 552,226

Int. Cl.² C05C *9/00*

U.S. Cl. 71—28 **14 Claims**

1. The method of producing a particulate multicomponent soil amendment containing at least about 40 weight percent of a particle-form nitrifier selected from the group consisting of urea, ammonium nitrate and combinations thereof, an amount of calcium sulfate corresponding to at least about 10 weight percent of said amendment and sufficient to form the reaction product layer encapsulating said soil additive hereinafter detailed, and an agronomically effective amount of at least one additional soil additive selected from elemental sulfur, phosphates, borates and compounds having cations selected from the group consisting of potassium, calcium, iron, magnesium, boron, manganese, copper, zinc and molybdenum, said method including the steps of intimately mixing finely divided calcium sulfate dihydrate, particles of said nitrifier, and said additional soil additive under substantially anhydrous conditions, and reacting said calcium sulfate with said particle-form nitrifier at an elevated temperature sufficient to promote the endothermic reaction of said calcium sulfate and nitrifier and below the melting point of said nitrifier, and produce said

multicomponent soil amendment comprising said particle-form nitrifier coated with a layer of the reaction product of said hydrated calcium sulfate and said nitrifer containing said additional soil additive.

4,026,696

PARTICULATE MULTICOMPONENT SOIL ADDITIVE

Donald C. Young, Fullerton, Calif., assignor to Union Oil Company of California, Brea, Calif.

Continuation-in-part of Ser. No. 552,226, Feb. 24, 1975. This application Oct. 18, 1976, Ser. No. 733,142

Int. Cl.² C05C *9/00*

U.S. Cl. 71—28 **11 Claims**

1. The method of producing a stable particulate soil amendment containing at least about 40 weight percent of a particle-form nitrifier selected from the group consisting of urea, ammonium nitrate and combinations thereof, and an amount of calcium sulfate corresponding to at least about 10 weight percent of said amendment and sufficient to form a reaction product layer around said particle-form nitrifier, including the steps of mixing finely divided calcium sulfate dihydrate and said nitrifier under substantially anhydrous conditions, and reacting the resulting mixture by heating said mixture under conditions sufficient to (a) maintain said mixture at an elevated temperature sufficient to promote the endothermic reaction of said calcium sulfate dihydrate and nitrifier and below the melting point of said nitrifier for a period of at least about 5 minutes, (b) bring said mixture to a temperature of at least about 200° F., and (c) produce said soil amendment comprising said particle-form nitrifier coated with a layer of the reaction product of said calcium sulfate dihydrate and said nitrifier, and containing less than about 1.5 weight percent total water on a total weight basis.

4,026,697

METHOD FOR UTILIZING BENZOPHENONE UREAS

Barrington Cross, Rocky Hill, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 365,807, May 31, 1973, Pat. No. 3,988,300. This application June 22, 1976, Ser. No. 698,649

Int. Cl.² A01N *91/20*

U.S. Cl. 71—120 **10 Claims**

1. A method for controlling undesirable broad leaf weeds and grasses comprising: contacting said undesirable weeds and grasses with a herbicidally effective amount of a compound selected from the group consisting of 3-(p-benzoylphenyl)-1,1-dimethyl urea, 3-(m-benzoylphenyl)-1,1-dimethyl urea, 3-(4-benzoyl-3-chlorophenyl)-1,1-dimethyl urea, 3-[3-chloro-4-)p-chlorobenzoyl)phenyl]-1,1-dimethyl urea, and 3-[p-(p-chlorobenzoyl)-phenyl]-1,1-dimethyl urea.

4,026,698

REMOVAL OF TIN FROM MOLTEN IRON BY CHLORINATION, USING OXYGEN TO CONSERVE CHLORINE AND TO PRODUCE TIN OXIDE

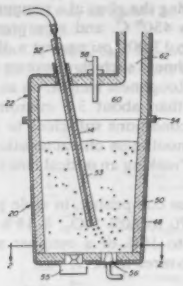
Valentin Koump, Greensburg, Pa., assignor to Urban Reclamation Technologies, Inc., Greensburg, Pa.

Filed Sept. 18, 1975, Ser. No. 614,498

Int. Cl.² C21C *5/30*

U.S. Cl. 75—59 **11 Claims**

1. A process for detinning an iron melt containing minor concentrations of elements other than iron including tin, said process comprising the steps of bubbling chlorine through said melt in order to produce a flow of gas from said melt and through a reaction region outside of said melt, said gas including vapors of metal chlorides, reacting oxygen with said metal chlorides as it flows from said melt in said reaction region to produce metal oxides and chlorine gas, removing said metal oxides from said reaction region, and recycling said last-mentioned chlorine into said melt, said melt being carried by a reaction vessel and said reaction regions is above said melt in



said reaction vessel, said reacting with oxygen occuring at a temperature at least as great as 1550° C.

4,026,699

MATRIX-STIFFENED HEAT AND CORROSION RESISTANT ALLOY

Herbert Louis Eiselstein; Edward Frederick Clatworthy, and Darrell Franklin Smith, Jr., all of Huntington, W. Va., assignors to Huntington Alloys, Inc., Huntington, W. Va.

Filed Feb. 2, 1976, Ser. No. 654,595

Int. Cl.² C22C *38/48*

U.S. Cl. 75—134 F **5 Claims**

1. An alloy consisting essentially of 17 to 22% chromium, nickel in an amount up to 44% and at least sufficient to satisfy the relationship

% Ni equal at least 4/3(% Cr) plus 8.8

1.75 to 3.0% columbium, up to about 1% manganese, up to about 1% silicon, up to about 0.1% carbon, up to about 0.5% titanium provided the total of % Ti plus 0.216(% Cb) does not exceed 0.85%, up to about 0.5% aluminum and balance iron with any presence of molybdenum and tungsten not exceeding 0.5% molybdenum and 0.5% tungsten.

4,026,700

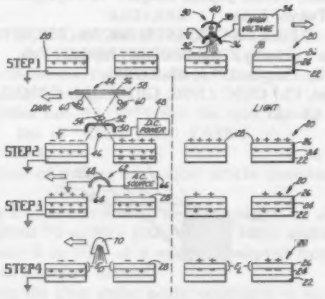
CHARGED PARTICLE MODULATOR DEVICE AND IMPROVED IMAGING METHODS FOR USE THEREOF

Houshang Rasekhi, Warrensville Heights, Ohio, assignor to Addressograph Multigraph Corporation, Cleveland, Ohio

Filed Feb. 24, 1975, Ser. No. 552,184

Int. Cl.² G03G *13/14*

U.S. Cl. 96—1 R **17 Claims**



1. The method of producing a charge distribution system ona modulator structure formed by placing a photoconductive layer between a conductive screen and a top transparent insulating layer, comprising the steps of:

applying an electrostatic DC charge of a first polarity to said top layer simultaneous with the application of a blanket exposure to electromagnetic radiation;

exposing said modulator to a pattern of light and shadow directed against said top layer and simultaneously applying a second DC charge oppositely poled to said first polarity to produce dark and light exposed zones on said modulator;

sweeping the surface of said top layer with AC charges under conditions in which said modulator is protected from radiation exposure;

flood irradiation of the top layer with electromagnetic radiation; whereby said charge distribution system is comprised of potential gradients between the conductive layer and said insulating layer in said dark and light zones respectively as represented by oppositely poled voltages on said top layer.

17. The method of making a reproduction of a graphic original by collecting charged particles on a dielectric medium through the use of a modulator structure formed by placing a photoconductive layer between a conductive screen and a top transparent insulating layer, comprising the steps of:

applying an electrostatic DC charge of a first polarity to said top layer simultaneous with the application of a blanket exposure to electromagnetic radiation;

exposing said modulator to a pattern of light and shadow directed against said top layer and simultaneously applying a second DC charge oppositely poled to said first polarity of produce dark and light exposed zones on said modulator;

modifying the voltages on the surface of the transparent insulating layer to a predetermined level by sweeping the surface with AC charges emitted from a controlled voltage electrode source;

flood irradiation of the top layer with electromagnetic radiation;

whereby there is established zones on said modulator adapted to selectively block and transmit charged particles;

directing said charged particles from a particle emission source against the conductive layer of said modulator; and

collecting those particles transmitted by said modulator to said dielectric medium and causing the attraction of the remaining particles on the modulator in the blocked zones.

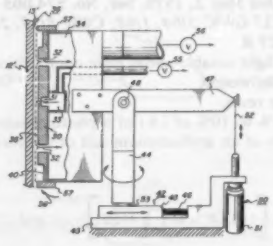
4,026,701
GAS IMPINGEMENT AND SUCTION CLEANING APPARATUS

Henry R. Till, Rochester, and Nero R. Lindblad, Palmyra, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Feb. 24, 1975, Ser. No. 552,392

Int. Cl.² A47L *5/38*

U.S. Cl. 96—1 R **48 Claims**



40. A process for cleaning the surface of an electrostatographic imaging member comprising:

providing a means for impinging a gas flow under pressure against said surface for removing residual material therefrom;

providing a means for applying suction to said surface to provide a suction flow for collecting said gas, said residual material and ambient air and transporting them away from said surface;

forming a gas cushion between said surface and said impingement means and suction means for supporting said impingement means and suction means close to said imaging surface, said gas cushion forming step including said steps of impinging a gas flow under pressure against said surface and applying suction to said surface; and further including the step of balancing said gas flow and suction flow to create a stable gas cushion.

46. A process as in claim **40**, further including the steps of forming an electrostatic image on said surface; developing said image to render it visible; and transferring said developed image to a sheet of final support material prior to said gas impingement and suction applying steps.

4,026,702
PHOTOCONDUCTIVE ELEMENT HAVING A LAYER INCLUDING A PHOTOCONDUCTIVE CADMIUM COMPOUND AND HYDROPHOBIC COLLOIDAL SILICA

Michiel van den Brink, Venlo, and Andreas C. Stoot, Blerick, both of Netherlands, assignors to Oce-van der Grinten N.V., Venlo, Netherlands

Filed Nov. 28, 1975, Ser. No. 636,201

Claims priority, application United Kingdom, Nov. 28, 1974, 51620/74

Int. Cl.² G03G *5/04*

U.S. Cl. 96—1.5 **5 Claims**

1. Photoconductive element which comprises a support carrying a photoconductive layer, said layer comprising a photoconductive cadmium compound selected from the group consisting of photoconductive cadmium sulphide, cadmium selenide and cadmium sulphoselenide dispersed in an organic polymeric binder and hydrophobic colloidal silica dispersed therein in an amount sufficient to enhance electrophotographic properties of said layer.

4,026,703
DUAL-LAYERED PHOTORECEPTOR USE IN ELECTROPHOTOGRAPHY

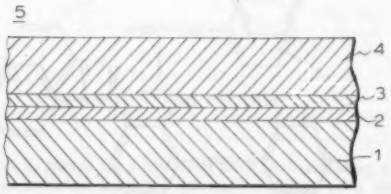
Yoshiki Hayashi, Hirakata; Masanaru Hasegawa, Kadoma; Takeo Fusayama; Kazuhiko Kosuge, both of Otsu, and Kenji Hayashi, Kyoto, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Mar. 26, 1975, Ser. No. 562,152

Claims priority, application Japan, Mar. 29, 1974, 49-36305

Int. Cl.² G03G *5/02*

U.S. Cl. 96—1.5 **8 Claims**



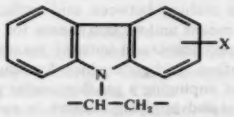
1. An electrophotographic photoreceptor for producing an electrostatic latent image on the top layer thereof which comprises from the bottom up:

a. a substrate

b. a layer of metallic palladium having a thickness of from 5A to 1000A,

c. a layer including vitreous selenium having a thickness of from 0.05 to 3 microns and

d. a top layer including polyvinyl carbazole having a recurring unit of the formula:



wherein X is a member selected from a group consisting of hydrogen, halogen, nitro, alkyl, aryl, alkyl aryl, amino and alkylamino.

4,026,704

ELECTROPHOTOGRAPHIC RECORDING MATERIAL

Jurgen Rochlitz, Wiesbaden, and Richard Lehner, Wiesbaden-Erbenheim, both of Germany, assignors to Hoechst Aktiengesellschaft, Germany

Continuation-in-part of Ser. No. 312,268, Dec. 5, 1972, abandoned. This application Aug. 12, 1975, Ser. No. 604,041

Claims priority, application Germany, Dec. 8, 1971, 2160812

Int. Cl.² G03G *5/06*

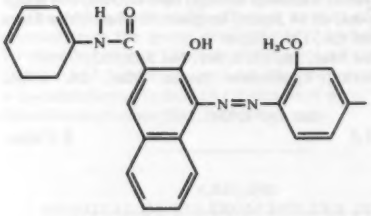
U.S. Cl. 96—1.5 **7 Claims**

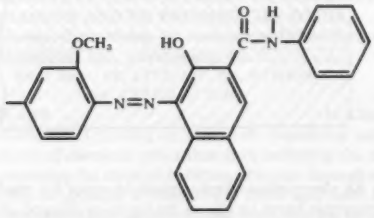
1. Electrophotographic recording material comprising an electrically conducting carrier and a photoconducting laminate thereon, the latter comprising a base layer and a top layer each containing the same organic photoconductor and a binder,

said top layer containing said photoconductor in an amount of about 40 to 60 percent by weight, and said base layer containing said photoconductor in an amount of about 5 to 10 percent by weight, based upon the weight of the respective layer,

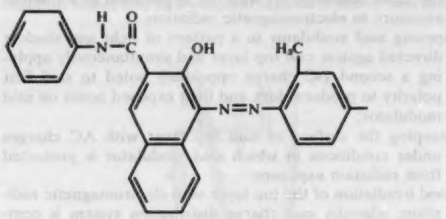
said base layer containing a bisazo dyestuff in an amount in the range of about 20 to 90 percent by weight, based upon the weight of the base layer,

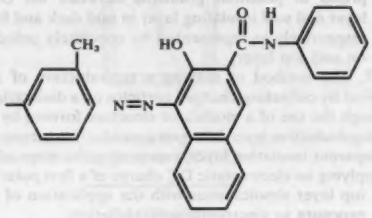
and said bisazo dyestuff being selected from the group consisting of Diana Blue (C.I. 21,180) having the formula



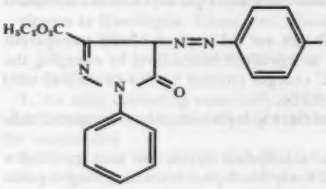


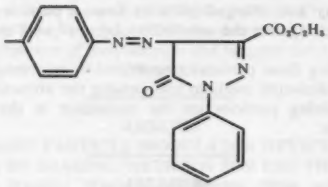
Diana Blue (C.I. 21,180) which is substituted by methy groups instead of methoxy groups and which is a compound corresponding to the formula





and Pigment Red 39 (C.I. 21,080) having the formula





4,026,705

PHOTOCURABLE COMPOSITIONS AND METHODS

James V. Crivello, Elnora, and Siegfried H. Schroeter, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed May 2, 1975, Ser. No. 574,005

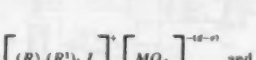
Int. Cl.² G03C *5/04, 1/68;* **C08F** *8/18, 2/46*

U.S. Cl. 96—27 R **13 Claims**

1. A visible light curable epoxy resin composition consisting essentially of by weight

A. an epoxy resin,

B. from 0.1% to 10% of (A) of a photoinitiator consisting essentially of an aryliodonium salt of the formula,



and

C. from 0.001% to 3%, based on the weight of (A), of a cationic dye, selected from the class consisting of Acridine orange, Acridine yellow, Phosphine R, Benxoflavin and Setoflavin T,

where R is a monovalent aromatic organic radical, R^1 is a divalent aromatic organic radical, M is a metal or metalloid and Q is a halogen radical, *a* is a whole number equal to 0 or 2, *b* is a whole number equal to 0 or 1, the sum of $a+b$ is equal to 2 or the valence of I,

$c=d-e$

e=valence of M and is an integer equal to 2 to 7 inclusive, and

$d>e$ and is an integer having a value up to 8.

4,026,706

SILVER HALIDE MULTILAYER PHOTOSENSITIVE MATERIAL

Shinichi Nakamura; Hidehiko Ishikawa; Katsuo Mogaki; Mikio Sato, all of Odawara; Shui Sato, Hino; Masahiko Taguchi, and Haruhiko Sato, both of Odawara, all of Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

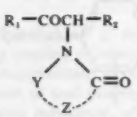
Filed June 21, 1974, Ser. No. 481,701

Claims priority, application Japan, July 2, 1973, 48-73608

Int. Cl.² G03C *3/00, 7/00, 1/40*

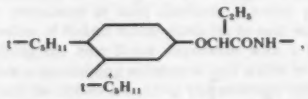
U.S. Cl. 96—74 **8 Claims**

1. A silver halide photosensitive material comprising a support; a blue-sensitive silver halide emulsion layer containing a yellow coupler represented by the following general formula



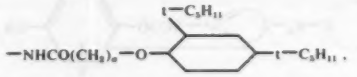
[I]

where R_1 stands for a group selected from the groups consisting of an alkyl group, alkenyl group, aryl group and heterocyclic group, each of which may be substituted with a group taken from the class consisting of $C_nH_{2n+1}O$-, wherein n = 1 to 18, $C_{15}H_{31}CONH$-,

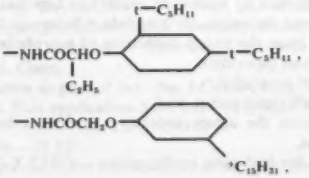


and

R_2 stands for a group selected from a cyano group and N-phenylcarbamyl group which may be substituted with a substituent taken from the class consisting of fluorine, chlorine,



wherein a = 1 to 4,



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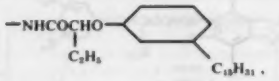
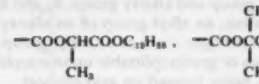
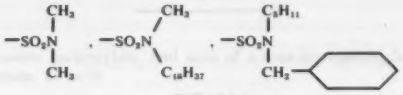
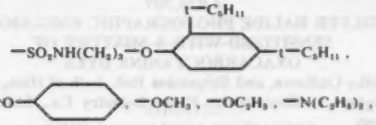


1 —COOM, where M = sodium or potassium,

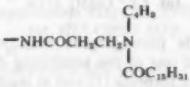


$COOCH_2COOC_{12}H_{25}$,

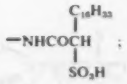




$-COOC_bH_{2b+1}$, wherein b = 1 to 14,

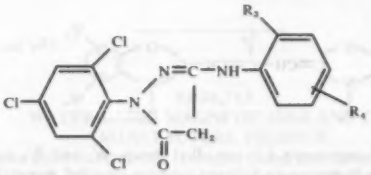


$-NHCOC_{15}H_{31}$, and



Y stands for a group selected from the groups consisting of —CO—, $-SO_2-$, —N=, —CH=, and —C , and Z stands for nonmetallic atoms required to complete a 4-to 6-membered heterocyclic nucleus;

a green-sensitive silver halide emulsion layer containing a magenta coupler represented by the following general formula



[II]

wherein R_3 stands for a hydrogen atom, halogen atom or a group selected from the groups consisting of a nitro group, alkyl group, alkoxy group and acylamino group, and R_4 stands for a hydrogen atom, halogen atom, or mono-valent organic residue;

a red-sensitive silver halide emulsion layer containing a cyan coupler represented by the following general formula

[III]

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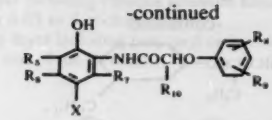


wherein R_5, R_6 and R_7 stand for a hydrogen atom, halogen atom or a group selected from the groups consisting of an alkyl group, aryl group and alkoxy group, R_8 and R_9 stand for a hydrogen atom, an alkyl group or an alkoxy group, R_{10} stands for a hydrogen atom or an alkyl group, and X stands for an atom or group splittable upon coupling; and said three layers being formed on said support.

4,026,707

SILVER HALIDE PHOTOGRAPHIC EMULSION SENSITIZED WITH A MIXTURE OF OXACARBOCYANINE DYES

Tadahiko Obikawa, and Shigemasa Itoh, both of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Hino, Japan

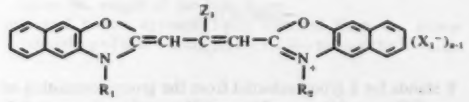
Filed Aug. 12, 1976, Ser. No. 713,966

Claims priority, application Japan, Aug. 15, 1975, 50-99275; Aug. 19, 1975, 50-101018

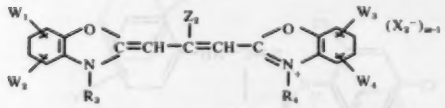
Int. Cl.² G03C 1/14

U.S. Cl. 96—95 **26 Claims**

1. A silver halide photographic emulsion containing in combination at least one of the sensitizing dyes expressed by the following general formula (I) and at least one of the sensitizing dyes expressed by the following general formula (II):



wherein Z_1 represents a methyl or ethyl group, R_1 and R_2 each represent an alkyl or sulfoalkyl group, X_1^- represents acid anions, and n represents an integer of 1 or 2, but n is 1 when the sensitizing dye forms an intramolecular salt;



wherein Z_2 represents a lower alkyl group, W_1 and W_2 each represent a hydrogen or halogen atom or an alkyl group, W_3 and W_4 each represent a hydrogen or halogen atom or an alkyl, alkoxy, hydroxy or phenyl group, where W_3 and W_4 may be joined to form a benzene ring, but at least one of said W_1, W_2, W_3 and W_4 is a halogen atom, R_3 and R_4 each represent an alkyl, sulfoalkyl or carboxyalkyl group, X_2^- represents acid anions, and *m* represents an integer of 1 or 2, but *m* is 1 when the sensitizing dye forms an intramolecular salt.

19. The silver halide photographic emulsion according to claim 1, wherein the emulsion comprises a development inhibitor releasing compound which has a 1-phenyl-5-mercaptotetrazolyl group therein.

4,026,708

DIRECT-POSITIVE SILVER HALIDE EMULSIONS HAVING INCORPORATED DEVELOPERS

Willy Joseph Vanassche, Kontich; Robert Joseph Pollet, Vremde; Jozef Frans Willems, Wilrijk; Antoon Leon Vandenberghe, Hove; Jules Robert Berendsen, Deurne, and Herman Alberik Pattyn, Kapellen, all of Belgium, assignors to AGFA-GEVAERT, N.V., Mortsel, Belgium

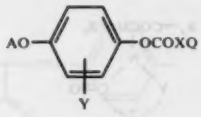
Filed Feb. 21, 1975, Ser. No. 552,036

Claims priority, application United Kingdom, Feb. 28, 1974, 9105/74

Int. Cl.² G03C 1/06, 5/24

U.S. Cl. 96—95 **8 Claims**

1. A direct-positive photographic element comprising a support and at least one direct-positive silver halide emulsion layer containing fogged silver halide grains wherein the said element comprises in the emulsion layer and/or in a colloid layer in water-permeable relationship with the emulsion layer a 1,4-dihydroxybenzene compound wherein at least one of the hydroxyl groups has been esterified to form a hydrolyzable aliphatic acyloxy group comprising a quaternary ammonium group having the general formula:

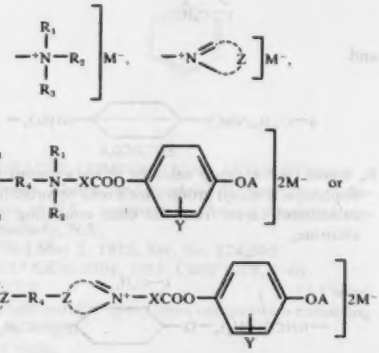


wherein:

Y is hydrogen, alkyl or halogen,

X is methylene or ethylene which may be substituted by alkyl or aryl,

Q is an ammonium group of the formula:



wherein:

M is an anion,

each of R_1 and R^2 is alkyl or aralkyl or together represent the atoms necessary to complete a heterocyclic ring selected from the group consisting of morpholine, pyrrolidine, and piperidine,

R_3 is alkyl or aralkyl,

R_4 is an alkylene group, and

Z represents the atoms necessary to close a heterocyclic nucleus,

A stands for hydrogen or the group —CO13 X-Q.

4,026,709

COLOR PHOTOGRAPHIC RECORDING MATERIAL

Bernhard Piller; Paul Tschopp; Thomas Stauner, and Walter Heierli, all of Marly, Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

Division of Ser. No. 446,248, Feb. 27, 1974, Pat. No. 3,984,432. This application Apr. 19, 1976, Ser. No. 677,942
Int. Cl.² G03C 1/40
U.S. Cl. 96—100 22 Claims

1. Color-photographic recording material with at least one light-sensitive silver halide emulsion layer which contains at least one color coupler having an active methylene group or a phenolic hydroxyl group and containing at least one radical of a phosphonic acid diester, phosphonic acid diamide or phosphonic acid ester amide.

4,026,710

PREPARATION OF ZINC FLAKE COATING COMPOSITION

Alexander W. Kennedy, Chardon, Ohio, assignor to Diamond Shamrock Corporation, Cleveland, Ohio

Filed Jan. 27, 1975, Ser. No. 544,057
Int. Cl.² C09D 5/10
U.S. Cl. 106—1 7 Claims

1. A process for making a zinc flake and hexavalent chrome-containing coating composition for providing an adherent and corrosion-resistant coating on a metal substrate, wherein the medium of said coating composition is supplied by water plus organic substance, which process comprises:

A. combining finely divided non-flaked zinc metal with a flaking medium liquid organic substance selected from the group consisting of diacetone alcohol, 2-ethoxyethanol and 2-butoxyethanol in an amount sufficient to provide a weight ratio of zinc metal to said substance of between about 3:1 and 1:3;

B. mechanically flattening and polishing said zinc particles while contained in said medium, thereby preparing a dispersion of flaked metal particles in said medium;

C. admixing the zinc flake dispersion with a hexavalent-chromium-containing substance and water in an amount sufficient to obtain a coating composition containing:

1. between about 50 and about 500 grams per liter of flaked zinc particles; and

2. above 15 but below about 50 volume percent of organic substance, basis the total volume of the composition liquid medium;

and sufficient hexavalent-chromium-containing substance to supply said composition with a weight ratio of chromium, expressed as CrO_3, to flaked zinc particles of between about 1:1 and 1:15; and,

D. mixing and blending said ingredients to obtain said zinc flake and hexavalent chromium-containing coating composition.

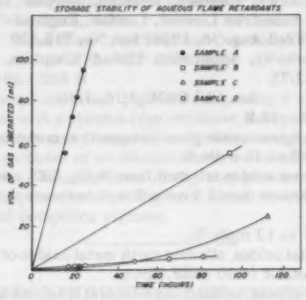
4,026,711

FLAME RETARDANT FINISH FOR TEXTILES

Robert George Weyker, North Plainfield, and William Frederick Baitinger, Jr., Hillsborough Township, Somerset County, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 147,566, May 27, 1971, abandoned. This application Nov. 11, 1971, Ser. No. 197,980
Int. Cl.² C09D 5/18
U.S. Cl. 106—15 FP 6 Claims

1. An aqueous flame retardant finish composition for cellulosic textile materials comprising tetrakis(hydroxymethyl)-phosphonium phosphate, tetrakis(hydroxymethyl)phos-



phonium carboxylate, and urea of a urea-formaldehyde condensate, or both.

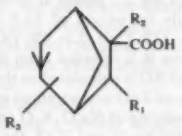
4,026,712

MICROORGANISM INHIBITORS

Emma-Jane E. Drury, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 508,312, Sept. 25, 1974, abandoned. This application Mar. 29, 1976, Ser. No. 671,211
Int. Cl.² C09D 5/14
U.S. Cl. 106—15 R 22 Claims

1. An aqueous suspension of a substance normally susceptable to the growth of microorganisms having contained therein a microorganism inhibiting quantity of a compound of the formula



wherein Y is a single or double bond, and R_1, R_2 and R_3 are each hydrogen or lower alkyl.

4,026,713

WATER BASED MAGNETIC INKS AND THE MANUFACTURE THEREOF

Carlos Juan Sambucetti, Mohegan Lake, and Joseph William Mitchell, Montrose, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 12, 1975, Ser. No. 586,444
Int. Cl.² C09D 11/02
U.S. Cl. 106—19 22 Claims

1. In an aqueous ferrofluid wherein finely-divided magnetic material is dispersed by surface active agents, the improvement comprising including in said ferrofluid (1) 3 to 12 percent by volume glycerol, (2) 1 to 7 percent by volume of a lower alkyl monoether of ethylene glycol and (3) 2 to 10 percent by volume of polyethylene diol having a molecular weight below about 200 or the monomethyl ether thereof.

4,026,714

PHOSPHATE GLASS COMPOSITIONS

Cyril John Lewis, Runcorn, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Aug. 30, 1976, Ser. No. 718,629

Claims priority, application United Kingdom, Sept. 19, 1975, 38552/75

Int. Cl.² C03C *3/16, 3/30*

U.S. Cl. 106—47 R 12 Claims

1. An inorganic oxide glass composition comprising

P_2O_5 — 52 to 72 mole %,

one or more oxides selected from B_2O_3, SiO_2 and Al_2O_3 — in total more than 3.5 mole % and not more than 12 mole %,

PbO — 1 to 12 mole %,

alkali metal oxides, alkaline earth metal oxides or zinc oxide — in total 4 to 30 mole %,

there being present in the composition at least one alkali metal oxide and at least one oxide selected from alkaline earth metal oxides and zinc oxide, the composition having a transformation temperature in the range 180° C to 400° C.

4,026,715

GLASS COMPOSITIONS, FIBERS AND METHODS OF MAKING SAME

Thomas D. Erickson, Newark, and Warren W. Wolf, Reynoldsburg, both of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Continuation-in-part of Ser. No. 340,982, March 19, 1973, Pat. No. 3,847,627, which is a continuation-in-part of Ser. No. 298,702, Oct. 18, 1972, abandoned, which is a continuation-in-part of Ser. No. 248,360, April 28, 1972, abandoned. This application Aug. 22, 1974, Ser. No. 499,722

The portion of the term of this patent subsequent to Nov. 12, 1991, has been disclaimed.

Int. Cl.² C03C *13/00, 3/04*

U.S. Cl. 106—50 11 Claims

1. A boron and fluorine free fiberizable glass composition having a liquidus temperature of about 2250° F., or less and having a viscosity of log 2.5 poises at about 2450° F., or less, consisting essentially by weight of 54.5 to 60% SiO_2, 9 to 14.5% Al_2O_3, 17 to 24% CaO, 2 to 4% TiO_2, 1.5 to 4% MgO, 1 to 6% RO, wherein R is selected from the group consisting of Zn, Sr and Ba and RO is calculated as the equivalent molecular weight percent of ZnO and an alkali metal oxide selected from the group consisting of Na_2O, K_2O and Li_2O, comprising between 1% and 3% Na_2O and K_2O, the K_2O calculated as Na_2O in equivalent weight percent and between 1% and 2% by weight Li_2O, and combinations of such alkali metal oxides in equivalent total weight percent, the total Na_2O, K_2O, and Li_2O not exceeding 3% by weight.

4,026,716

CONCRETE COMPOSITION

George C. Urschel III, Toledo, and George G. Judd, Woodville, both of Ohio, assignors to Woodville Lime and Chemical Company, Woodville, Ohio

Continuation-in-part of Ser. No. 558,944, March 17, 1975, abandoned. This application June 28, 1976, Ser. No. 700,508

Int. Cl.² C04B *7/02*

U.S. Cl. 106—97 6 Claims

1. A cementitious structural composition consisting essentially of Portland cement, dolomitic limestone as a low-silica manufactured fine aggregate, water and from about 5 to 15 percent by weight, based on the manufactured fine aggregate, of a precipitate comprising CaO-MgO from the gaseous effluent from a kiln burning dolomitic limestone, said precipitate having a particle size essentially less than 5 microns.

4,026,717

ECONOMICAL, FINELY CONTROLLED CEMENT PRODUCTION

Philip H. Harris, Fort Worth; Virgil L. Sewell, and James. L. Stevens, both of Dallas, all of Tex., assignors to Texas Industries, Inc., Dallas, Tex.

Filed Sept. 8, 1975, Ser. No. 611,209

Int. Cl.² C04B *7/44*

U.S. Cl. 106—100 20 Claims

1. A method of manufacturing portland cement comprising the steps of:

a. providing a source of a first mixture including calcareous material that is coarsely ground and can contain sizes up to 3/8 inch in lateral dimension for a cement;

b. providing a second source of a second mixture including at least one of an argillaceous material that is coarsely ground and can contain sizes up to one-fourth inch in lateral dimension and a siliceous material that is coarsely ground and can contain sizes up to one-fourth inch in lateral dimension;

c. admixing a first rate of said first mixture from said first source and a second rate of said second mixture from said second source, and conveying and introducing in an on-line process said first and second mixtures to the feed end of a kiln for producing cement clinker when reacted at a high temperature as they traverse down the kiln; said first and second mixtures being so constituted as to prepare a desired balanced portland cement clinker when admixed in the proper proportions; said first and second rates being such that said proper proportions of said first and second mixtures are fed into the feed end of said kiln;

d. repeatedly sampling said first and second mixtures being conveyed toward said feed end of said kiln at a pre-kiln location upstream of said feed end;

e. analyzing the respective samples collected at said pre-kiln location;

f. automatically comparing the analyses of said respective samples with a predetermined analysis to thereby define a deficiency of ingredients with respect to said balanced portland cement clinker;

g. adjusting in said on-line process said proportion of said first and second mixtures coming from respective first and second sources to form new said proportions to correct each said deficiency;

h. repeatedly sampling the materials in said kiln at a predetermined point downstream from said feed end;

i. analyzing by rapid analysis means respective samples collected at said downstream point;

j. automatically comparing the analysis of respective samples with a predetermined analysis to thereby define a deficiency of ingredients with respect to said balanced portland cement clinker;

k. after a predetermined time interval after respective said sampling of step h., introducing into a combustion zone of said kiln at a third rate a third mixture and a fuel and burning at least said fuel; said third rate of said third mixture being that which will supply the deficiency of ingredients as determined from said samples at the predetermined point downstream from the feed end of said kiln; said third mixture including at least one of calcareous, argillaceous, and siliceous materials that is coarsely ground and can obtain sizes up to 1/8 inch in lateral dimension; said predetermined time interval being determined by kiln residence time from the predetermined point downstream of the feed end where the samples are taken to the discharge end of the kiln;

l. repeatedly sampling the final cement clinker coming out of the discharge end of said kiln;

m. analyzing the respective samples of final cement clinker to thereby define a deficiency of ingredients with respect to said desired balanced portland cement clinker; and

n. introducing into said combustion zone of said kiln at a fourth rate a fourth mixture that is finely ground and of a size −100 mesh; said fourth rate of said fourth mixture

being that required to supply the deficiency of ingredients defined by the analysis of said samples of said final cement clinker; said fourth mixture being finely ground so as to react relatively rapidly and enable obtaining a fine degree of control heretofore unavailable.

4,026,718

FILMS FROM MODIFIED REGENERATED CELLULOSE

Georges Cornille, Mariakerke; Roland Jacobs, Wetteren, and Walter Bontinck, Sint-Martens-Leerne, all of Belgium, assignors to U.C.B, Societe Anonyme, Brussels, Belgium

Filed Sept. 16, 1975, Ser. No. 614,025

Claims priority, application United Kingdom, Sept. 16, 1974, 40180/74

Int. Cl.² C08L *1/24*

U.S. Cl. 106—168 **16 Claims**

1. A clear, transparent modified regenerated cellulose film, which comprises regenerated cellulose and modified starch selected from the group consisting of starches degraded by oxidation, starches degraded by hydrolysis, starches degraded by oxidation and hydrolysis, uncrosslinked starch ethers and uncrosslinked starch esters, the starch of said ethers and esters being native starch or starch degraded by oxidation and/or hydrolysis, the amount of modified starch representing 1 to 49% by weight based on the total weight of cellulose and modified starch.

4,026,719

SULFUR COMPOSITION WITH MICA

Milutin Simic, Novato, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 529,258, Dec. 3, 1974, abandoned. This application Nov. 13, 1975, Ser. No. 631,781

Int. Cl.² C07G *17/00;* **C09K** *3/00*

U.S. Cl. 106—287 SC **9 Claims**

1. A composition comprising 50–98 weight percent sulfur, 0.2 to 20 weight percent sulfur plasticizer, and 5 to 20 weight percent mica.

4,026,720

COATING COMPOSITION FOR ACRYLICS

Tadayoshi Ikeda, Amagasaki, Japan, assignor to Daicel, Ltd., Osaka, Japan

Filed May 8, 1975, Ser. No. 575,600

Claims priority, application Japan, May 10, 1974, 49-51910

Int. Cl.² C08K *5/09;* **C08L** *83/06*

U.S. Cl. 106—287 SB **5 Claims**

1. A coating solution, consisting essentially of

a. from 10 to 40 percent by weight, based on the total weight of the coating composition, of a partially hydrolyzed siloxane substance obtained by hydrolyzing in water, at 50° to 80° C, for one to 10 hours, a substance selected from the group consisting of

1. a hydrocarbon trialkoxy silane having the formula $R'Si(OR'')_3$, wherein R' is selected from the group consisting of alkyl having one to 4 carbon atoms, phenyl and vinyl, and R'' is alkyl having one to 4 carbon atoms, and

2. co-condensation products of (1) and from 1 to 40 weight percent of phenyl or vinyl trialkoxy silane wherein alkoxy has one to 4 carbon atoms,

b. from 0.05 to 5 percent by weight, based on the weight of component (a), of one or a mixture of salts selected from the group consisting of alkali metal salts of naphthenic acid and zinc salts of naphthenic acid,

c. from 5 to 30 percent by weight, based on the total weight of the coating composition, of acetic acid, and

d. the balance is one or a mixture of inert organic solvents for components (a) and (b), said inert solvent or solvents being present in an amount sufficient, in combination with component (c), to completely dissolve components (a) and (b).

4,026,721

COMPOSITE SILICATE PIGMENT

Frederick L. Kurrle, Laurel, Md., assignor to Westvaco Corporation, New York, N.Y.

Filed Mar. 19, 1976, Ser. No. 668,436

Int. Cl.² C09C *1/28*

U.S. Cl. 106—288 B **17 Claims**

1. A composite white pigment comprising a clay pigment component with a platelet-type structure, said platelets having planar surfaces and a metal silicate component in the form of spherical particles of an alkaline earth metal silicate precipitated on the planar surfaces of the clay platelets, said metal silicate component comprising from about 10–90% by weight of the total composite pigment.

4,026,722

EXTENDED PIGMENTARY $BiVO_4$ COMPOSITION

Richard William Hess, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed June 22, 1976, Ser. No. 698,693

Int. Cl.² C09C *1/62*

U.S. Cl. 106—288 B **10 Claims**

1. A composition of the general formula

$$BiVO_4 . xAl_2O_3 . ySiO_2$$

where x and y represent moles of Al_2O_3 and SiO_2, respectively, per mole of $BiVO_4$, x is about 0.25–2.0, y is about 0.1–3.5, and x plus y is equal to or greater than 1.

4,026,723

ADMIXTURE OF ALKALI-METAL NITRATE WITH WATER-SOLUBLE CONDENSATE OF SULFONATED AROMATIC HYDROCARBON AND ALIPHATIC ALDEHYDE

Tibor T. Grof, New Carrollton, and Gloven G. De La Cruz, Takoma Park, both of Md., assignors to Arcal Chemicals, Inc., Seat Pleasant, Md.

Filed Oct. 30, 1975, Ser. No. 627,233

Int. Cl.² C04B *13/00*

U.S. Cl. 106—315 **20 Claims**

1. An essentially dry particulate cement-set accelerating composition comprising alkali-metal nitrate and a water-soluble member selected from the group consisting of:

a. (sulfonated aromatic hydrocarbon)/(aliphatic aldehyde) condensate and

b. an alkali-metal salt of (a),

the composition having a greater weight percentage of the alkali-metal nitrate than of the water-soluble member, the components being present in a ratio sufficient to impart a synergistic set acceleration to a cement composition.

4,026,724

METHOD FOR TREATMENT OF ELONGATED FLEXIBLE MATERIAL

Marcel A. P. Giros, Route de Saint-Dizier, Ancerville, France (55170)

Continuation-in-part of Ser. No. 361,616, May 18, 1973, Pat. No. 3,951,322, and a continuation-in-part of Ser. No. 666,198, March 12, 1976. This application Mar. 12, 1976, Ser. No. 666,199

Int. Cl.² B08B *1/00, 1/02*

U.S. Cl. 134—14 **8 Claims**

1. A method for treatment of elongated flexible materials consisting of metallic strips, bands, tubes and wires in an elongated container prefilled with a treatment fluid comprising the steps of:

A. Coiling the elongated material into loops

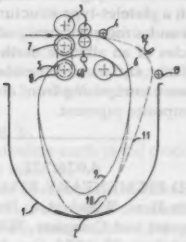
B. Imparting to the material the shape of a helix

C. Introducing the helix into a container having a cross-sectional shape of an arch at an initial inlet speed under a positive impelling force

D. Causing at least a partial immersion of the loops of the helix in treatment acid in the container

E. Advancing the helix through the container at a predetermined advance speed

F. Correlating the inlet speed with the advance speed of the material at a predetermined ratio



G. Causing intermediate momentary intermittent interruptions in the advancement of loops resulting in controllable forward and backward wave patterns of the advancing helix of predetermined durations and amplitudes, frequencies and directions of the loops.

H. Correlating the advance speed with the exit speed at a predetermined ratio.

4,026,725

BATTERY ELECTROLYTE

Raymond A. Sutula, Laurel, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 24, 1973, Ser. No. 385,926
Int. Cl.² H01M 6/36
U.S. Cl. 429—52 **16 Claims**

1. In a lithium metal-chlorine gas battery comprising (1) a housing, (2) a lithium metal anode, (3) a cathode, and (4) an electrolyte which is an electrically nonconductive solid before the battery is activated but is an electrically conductive molten alkali halide salt after the battery is activated, the improvement comprising:

A. the electrolyte before activation of the battery comprising:

i. from about 10 to about 80 percent by weight of a powdered alkali metal carbide selected from the group consisting of (1) sodium carbide and (2) a mixture of sodium carbide and a carbide selected from the group consisting of (a) lithium carbide, (b) potassium carbide, (c) rubidium carbide, (d) cesium carbide and (e) mixtures thereof;

ii. from about 20 to about 90 percent by weight of a alkali metal halide of the formula M^+X^- wherein M is selected from the group consisting of Li, Na, K, Rb, Cs, and mixtures thereof, and X is selected from the group consisting of F, Cl, and mixtures thereof, the alkali metal halide contacting the powdered alkali metal carbide;

provided that after the battery is activated, the carbon in the electrolyte does not exceed 27 percent by weight;

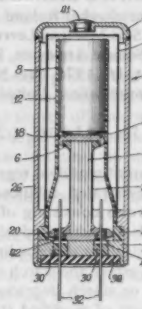
B. means for activating the battery by supplying chlorine gas to react with the powdered alkali metal carbide, the reaction between the chlorine gas and the alkali metal carbide generating heat to melt the electrolyte and producing products which are compatible with the electrolyte.

4,026,726

NUCLEAR BATTERY SHOCK-SUPPORT SYSTEM

Homer Charles Carney, Del Mar, Calif., assignor to General Atomic Company, San Diego, Calif.

Filed Dec. 1, 1975, Ser. No. 636,812
Int. Cl.² 136 203; H01V 1/02, 1/12
U.S. Cl. 136—202 **12 Claims**



1. In a nuclear thermoelectric battery having a radioisotope heat source, a heat sink displaced from said heat source, and a thermoelectric converter between said heat source and said heat sink and in a thermoconductive relationship therewith, a shock support system for said thermoelectric converter, said shock support system comprising:

a first alignment cap between said converter and said heat sink,

a second alignment cap between said converter and said heat source, said first and second caps being thermally conductive,

said alignment caps having relieved surfaces operative to slide or rock upon battery shock or vibration, and

spring means disposed between said second alignment cap and said heat source, said caps and said spring means serving to provide a thermoconductive relationship between said converter and said heat source and said heat sink, while also serving to protect said converter from shock, vibration and other external forces.

4,026,727

FATIGUE RESISTANT STEEL, MACHINERY PARTS AND METHOD OF MANUFACTURE THEREOF

Charles W. Finkl, and Albert L. Lehman, both of Chicago, Ill., assignors to A. Finkl & Sons Company, Chicago, Ill.

Filed Nov. 4, 1975, Ser. No. 628,748
Int. Cl.² C22C 38/06, 38/44, 38/46
U.S. Cl. 148—2 **7 Claims**

1. A machinery part made from a steel having, after conventional post-melting treatment, high fatigue resistance and a low inclusion frequency, said steel having a grain size of ASTM 5 or finer and consisting of:

C — from about 0.16 to about 0.28,
Mn — from about 0.50 to about 1.00,
Si — from about 0.15 to about 0.35,
Ni — from about 0.40 to about 1.10,
Cr — from about 0.40 to about 1.15,
Mo — from about 0.15 to about 0.30,
S — 0.025 max.,
P — 0.025 max.,

together with:

a. V from a minimum of about 0.04 in the absence of Al to a maximum of about 0.08, or

b. Al from a minimum of about 0.030 in the absence of V to a maximum of about 0.10, or

c. V and Al in combination in an amount sufficient to produce a grain size of ASTM 5 or finer,

said V and/or Al being present in an amount sufficient, with respect to (a) and (b) as well as (c) above, to produce a grain size of ASTM 5 or finer, and

Fe — Balance
H_2 — 2.5 ppm maximum
O_2 — 50 ppm maximum

4,026,728

STEEL SHEETS AND STRIPS HAVING A SURFACE LAYER OF M-SI-R

Katsuyoshi Yoshida, Tokai; Zyun-Ichi Morita, Aichi, and Kenzi Koyama, Tokai, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Sept. 29, 1975, Ser. No. 617,652
Claims priority, application Japan, Oct. 1, 1974, 49-113063
Int. Cl.² C23F *7/00*
U.S. Cl. 148—6.14 R **7 Claims**

1. A surface treated steel sheet and strip having a surface layer of M-Si-R in which M is at least one element selected from the group consisting of chromium, phosphorus, silicon, cobalt, manganese, copper, nickel, aluminum and titanium, and R is a group of atoms which has 2 to 10 carbon atoms and contains one or more functional groups selected from the group consisting of vinyl, epoxy, acryl and amino groups.

4. A process for surface treatment of a steel sheet comprising treating a base steel sheet in a solution containing at least one compound selected from the group consisting of chromic acid, phosphoric acid, salts of chromium, molybdenum, silicon, cobalt, manganese, copper, nickel, aluminum and titanium, and then treating the steel sheet thus treated in a solution containing at least one organic silicon compound having a general formula of $RSiX_3$, in which R is a group of atoms which has 2 to 10 carbon atoms and contains one or more functional groups selected from the group consisting of vinyl, epoxy, acryl and amino groups and X stands for a halogen or an alkoxyl group.

4,026,729

METHOD OF MAKING A SOFT STEEL SHEET BY CONTINUOUS ANNEALING

Kazuhide Nakaoka; Kenji Araki, both of Yokohama; Takayoshi Shimomura, Fukuyama; Haruo Kubotera, Yokohama; Shinobu Osaka, Fukuyama; Nobuo Tanaka, Fukuyama; Hiroshi Kuroda, Fukuyama, and Takao Kurihara, Yokohama, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 17, 1975, Ser. No. 632,570
Claims priority, application Japan, Dec. 5, 1974, 49-138844
Int. Cl.² C21D *7/14*
U.S. Cl. 148—12.4 **1 Claim**

1. In a continuous annealing process of making cold-reduced press-forming sheet of Al-killed, rimmed, silicon semi-killed or capped steel, the improvement of imparting uniform quality over the entire length of said steel sheet, comprising the steps of

A. mounting said steel strip on a run-out table after hot rolling;
B. starting impinging water jet on said steel strip after said steel strip has travelled 20 to 200 meters;
C. stopping said water cooling before 20 to 200 meters of the end of said steel strip; and
D. coiling the said strip at a temperature of more than 630° C, thereby to provide uniform self-annealing effect over the entire length of said strip, said process being characterized by the absence of any water being applied to either end of said sheet for a distance of 20 to 200 meters — has been inserted.

4,026,730

NITRIDED MATERIALS

Ray J. Van Thyne, Oak Lawn, and John J. Rausch, Antioch, both of Ill., assignors to Surface Technology Corporation, Oak Lawn, Ill.

Continuation-in-part of Ser. Nos. 324,641, Jan. 18, 1973, abandoned, and Ser. No. 324,769, Jan. 18, 1973, abandoned, and Ser. No. 324,680, Jan. 18, 1973, abandoned, said Ser. No. 324,641, is a continuation-in-part of Ser. No. 99,663, Dec. 18, 1973, abandoned, Ser. No. 324,769, , which is a continuation-in-part of Ser. No. 99,664, Dec. 18, 1970, abandoned. This application Nov. 20, 1974, Ser. No. 525,447
Int. Cl.² C22C *27/02*
U.S. Cl. 148—31.5 **14 Claims**

1. A graded, nitrided cutting tool material having a nitrogen pickup of at least 0.1 milligram per square centimeter of surface area with the nitrided concentration lessening inwardly from the surface, having excellent cutting and abrasion resistant properties consisting essentially of by weight:

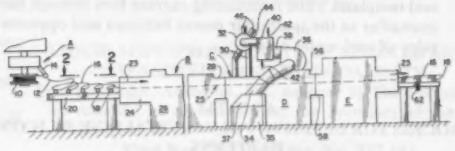
a. from 55% to 85% of a metal selected from the group consisting of columbium, vanadium and mixtures thereof;
b. from 10% to 40% of a metal selected from the group consisting of hafnium, titanium, zirconium, and mixtures thereof, and wherein both hafnium and at least one metal of the group titanium and zirconium is present;
c. hafnium content is equal to or greater than the content of titanium, zirconium and mixtures thereof;
d. hafnium content ranges from 5% to 35%; and
e. the minimum content of a metal selected from the group consisting of titanium, zirconium and mixtures thereof is 5%.

4,026,731

METHOD FOR HEAT TREATING WIRE

Ralph J. Perrine, Salem, Ohio, assignor to The Electric Furnace Company, Salem, Ohio

Division of Ser. No. 467,254, May 6, 1974, abandoned, which is a continuation-in-part of Ser. No. 166,826, July 28, 1971, abandoned. This application May 14, 1975, Ser. No. 577,353
Int. Cl.² C21D *1/18*
U.S. Cl. 148—134 **4 Claims**



1. The method of uniformly heat treating a non-uniform steel product having a portion of greater mass and a portion of lesser mass, said product having a known transformation temperature and a known interval of time in which transformation occurs, said method comprising the following steps:

a. heating said non-uniform product to an elevated austenizing temperature;
b. rapidly and uniformly cooling said non-uniform product to a lower temperature which is substantially below said transformation temperature by passing an amount of coolant gas over the portions of said non-uniform product of greater mass and by passing a proportionately lesser amount of coolant gas over the portions of said non-uniform product of lesser mass;
c. reheating said non-uniform product in a gaseous atmosphere until it is uniformly heated to said transformation temperature;
d. holding said non-uniform product at said transformation temperature for said known interval of time whereby transformation has occurred in said product; and,
e. then allowing said product to continue to cool to a tem-

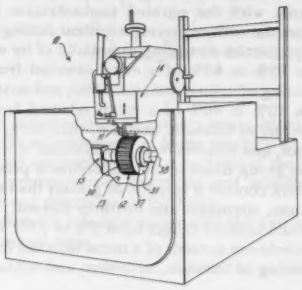
perature substantially below said transformation temperature.

4,026,732

METHOD FOR INDUCTION HARDENING GEAR TEETH

Howard W. Dammel, Cincinnati; Robert M. Frantz, Milford; James H. Luke, Loveland, all of Ohio, and William G. Skrzypczyk, Harborcreek, Pa., assignors to Cincinnati Steel Treating Co., Cincinnati, Ohio and General Electric Company, Erie, Pa.

Filed Aug. 28, 1975, Ser. No. 608,630
Int. Cl.² C21D 1/18
U.S. Cl. 148—154 **10 Claims**



9. The method of heat treating a ferrous metal object so as to obtain a substantially uniform depth heat treatment across the full width of the object, which method comprises the steps of

locating a pair of templates of approximately the same peripheral contour as said metal object in close proximity to but spaced from at least a portion of a pair of opposite sides of the object, and

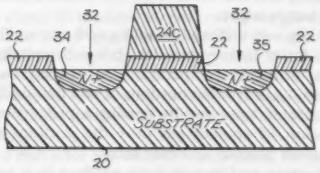
heating said metal object between said opposite sides of said object by sequentially and progressively moving a current intensifier past one of said templates, between said opposite sides of said metal object, and past the other one of said templates while maintaining current flow through the intensifier as the intensifier passes between said opposite sides of said metal object.

4,026,733

PROCESS FOR DEFINING POLYCRYSTALLINE SILICON PATTERNS

William H. Owen, III, Sunnyvale; Charles H. R. Steele, Santa Clara, and Richard D. Pashley, Mountain View, all of Calif., assignors to Intel Corporation, Santa Clara, Calif.

Filed Oct. 29, 1975, Ser. No. 626,857
Int. Cl.² H01L 21/26
U.S. Cl. 148—1.5 **8 Claims**



5. A process for fabricating a field-effect transistor on a silicon substrate which includes a gate oxide layer disposed on said substrate and a polycrystalline silicon gate layer disposed on said oxide layer, comprising the steps of:

forming a gate masking member on said polycrystalline silicon layer;

diffusing an impurity into said polycrystalline silicon gate layer such that unmasked silicon is doped with said impurity, and such that said impurity extends beneath said gate masking member to define an undoped region of a predetermined width; removing said masking member;

subjecting said polycrystalline silicon layer to an etchant which removes doped polycrystalline silicon, thereby defining a polycrystalline silicon gate;

forming a pair of spaced-apart openings through said gate oxide layer, adjacent to said gate; and,

doping regions of said substrate through said openings to form the source and drain regions of said transistor;

whereby a field-effect transistor may be fabricated where the width of said silicon gate is determined in part by said diffusion step.

4,026,734

METHOD OF COATING TITANIUM

Brian A. Manty, Lake Park, Fla., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jan. 16, 1976, Ser. No. 649,762
Int. Cl.² C23F 7/14, 7/06
U.S. Cl. 148—6.15 R **1 Claim**

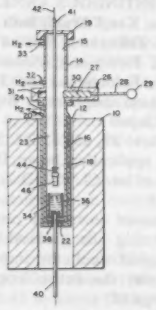
1. A method for imparting stress corrosion resistance to titanium articles which comprises the steps of immersing the said article into an aqueous solution of ammonium phosphate within a vacuum environment to effect the wetting of the surface of said article; removing said wetted article from said vacuum environment and heating said wetted article to a temperature of about **800°** F for a period of about **20** hours to produce a phosphate doped oxide coating on the surface of said article.

4,026,735

METHOD FOR GROWING THIN SEMICONDUCTING EPITAXIAL LAYERS

G. Sanjiv Kamath, Malibu, and Hollen P. Mitchell, Newbury Park, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Aug. 26, 1976, Ser. No. 717,806
Int. Cl.² H01L 21/208
U.S. Cl. 148—171 **6 Claims**



1. A liquid phase epitaxial process for growing thin high quality epitaxial semiconductor layers on a substrate with good nucleation and growth at the epitaxial layer-substrate interface, comprising the steps of:

a. providing a solution of a selected semiconductor material and at a predetermined elevated temperature;

b. enclosing a selected semiconductor substrate in a nonreactive container of a material having a known high thermal conductivity;

c. vertically immersing said container in said solution and maintaining said semiconductor substrate enclosed therein until substantial thermal equilibrium is established between said semiconductor substrate and said solution;
d. bringing said solution to approximately its saturation equilibrium temperature at which epitaxial deposition would normally begin to occur in said solution; and then
e. exposing said semiconductor substrate to said solution, whereby epitaxial growth on said substrate begins under conditions of substantial thermal equilibrium and substantial saturation equilibrium between said substrate and said solution.

4,026,736

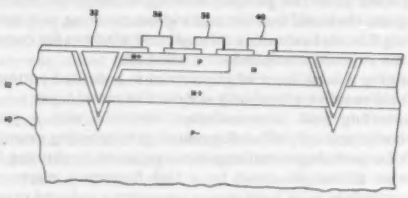
INTEGRATED SEMICONDUCTOR STRUCTURE WITH COMBINED DIELECTRIC AND PN JUNCTION ISOLATION INCLUDING FABRICATION METHOD THEREFOR

Israel Arnold Lesk, Scottsdale, Ariz., assignor to Motorola, Inc., Chicago, Ill.

Division of Ser. No. 430,433, Jan. 3, 1974, abandoned. This application July 18, 1975, Ser. No. 596,946

Int. Cl.² H01L *21/20*

U.S. Cl. 148—187 **5 Claims**



1. A method for fabricating an integrated semiconductor structure comprising the steps of:
forming a region of N+-type conductivity on a semiconductor substrate of P-type conductivity;
epitaxially growing a region of N-type conductivity on said region of N+-type conductivity;
etching at least one moat through said N+and N—type regions into said P-type semiconductor substrate surrounding a region of semiconductor material containing said N+ and N-type regions;
forming at least one region of P-type conductivity in said N-type conductivity region adjacent said moat;
forming a second region of N+-type conductivity in said P-type conductivity region adjacent said moat;
forming a P-type channel in said P-type substrate and said N-type region adjacent to said moat; and
filling in said moat with material having a coefficient of thermal expansion similar to the coefficient of thermal expansion of said semiconductor substrate.

4,026,737

METHOD FOR COLORING A STAINLESS STEEL

Tomoo Takahari; Shiyuichi Kondo; Nobumasa Sone; Kengi Hashimoto, and Tadashi Ishiguro, all of Hikari, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Oct. 17, 1975, Ser. No. 623,322

Claims priority, application Japan, Oct. 22, 1974, 49-121016; Oct. 23, 1974, 49-121325; Apr. 17, 1975, 50-45829

Int. Cl.² C23F *5/02, 7/00*

U.S. Cl. 148—6.14 R **15 Claims**

1. In a method for coloring a stainless steel wherein the stainless steel is immersed in a coloring bath for a period of time, the improvement which comprises:
a. determining for a given sample of said steel in the bath the difference between the standard inflexion point potential and the potential present when the sample has the desired color, the potentials being determined against a reference electrode immersed in the bath;
b. determining the individual inflexion point potential for a sample of the steel to be colored; and
c. immersing the steel to be colored in the bath for a period of time such that the coloring process is stopped when the potential difference between the individual inflexion point potential and the instantaneous potential is determined by the formula:

Potential difference

= potential difference for the standard sample when the sample has the desired color
± α (Standard inflexion point potential — individual inflexion point potential)

wherein α is + when a saturated calomel electrode is used and is - when a platinum electrode is used; and wherein α is between 0.23 to 0.36 when the individual inflexion point potential is nobler than the standard inflexion point and is between 0.44 and 0.61 when the individual inflexion point potential is base compared to the standard inflexion point potential.

4,026,738

STABILIZED, FOAMED WATER GEL EXPLOSIVES AND METHOD

Jean Paul Richard, St. Bruno, Canada, assignor to Canadian Industries, Ltd., Montreal, Canada

Filed Apr. 19, 1976, Ser. No. 678,222

Claims priority, application United Kingdom, May 8, 1975, 19381/75

Int. Cl.² C06B *33/02*

U.S. Cl. 149—44 **7 Claims**

1. A thickened and cross-linked, foamed, water-bearing explosive composition devoid of any self-explosive sensitizer and detonable in diameters greater than 5.1 cm comprising essentially water, at least one inorganic oxygen-supplying salt, a thickener cross-linker and entrapped gas bubbles, the said composition also containing a gas bubble stabilizer, which stabilizer comprises a combination of a foaming surfactant and a stabilizing surfactant and which gas bubble stabilizer is present in a quantity of between 0.1% and 10% by weight of the total explosive composition.

4,026,739

LIQUID MONOPROPELLANTS OF REDUCED SHOCK SENSITIVITY AND EXPLODABILITY

Otto Reitlinger, Arlington, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 29, 1963, Ser. No. 327,151

Int. Cl.² C06B *25/00*

U.S. Cl. 149—88 **2 Claims**

1. A liquid monopropellant comprising an aliphatic dinitrate ester selected from dinitroxyethane, dinitroxypropane, dinitroxybutane and dinitroxypentane and mixtures thereof with di-2, ethyl-n-hexyl sebacate.

4,026,740

PROCESS FOR FABRICATING NARROW POLYCRYSTALLINE SILICON MEMBERS

William H. Owen, III, Sunnyvale, Calif., assignor to Intel Corporation, Santa Clara, Calif.

Filed Oct. 29, 1975, Ser. No. 626,855

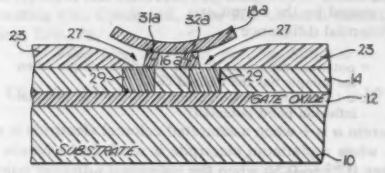
Int. Cl.² H01L *21/312*

U.S. Cl. 156—628 **14 Claims**

8. A process for fabricating a polycrystalline silicon structure from a polycrystalline silicon layer comprising the steps of:
forming a masking member on said silicon layer;
forming a masking layer on said silicon layer at least adjacent to one edge of said masking member;

subjecting said masking member and masking layer to a etchant so as to etch said masking member or masking layer to form a gap between an edge of said masking member and said masking layer;

doping a region of said silicon layer through said gap, the width of said region being substantially determined by the extent of said doping and being substantially independent of the width of said gap;



removing said masking member and said masking layer;

etching said silicon layer such that said doped region remains, thereby forming a polycrystalline silicon structure;

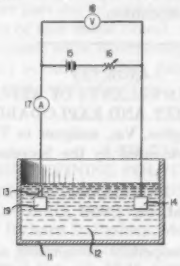
whereby a polycrystalline silicon structure may be formed where the critical dimensions of said structure are controlled by doping and are not substantially dependent on masking tolerance.

4,026,741

TECHNIQUE FOR PREPARATION OF STOICHIOMETRIC III–V COMPOUND SEMICONDUCTOR SURFACES

Chuan Chung Chang, Berkeley Heights; Paul H. Citrin, and Bertram Schwartz, both of Westfield, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 16, 1976, Ser. No. 696,563
Int. Cl.² B29C *17/08*; C25D *11/00*
U.S. Cl. 156—628 **6 Claims**



1. Technique for preparing stoichiometric Group III–V compound semiconductor surfaces which comprises the steps of

a. anodizing a group III–V compound semiconductor in an aqueous electrolyte having a pH within the range of 1.5–8 at an anodizing voltage within the range of 50–175 volts for a time period sufficient to yield an oxide film of approximately 1000 Angstroms,

b. etching off the oxide film with a basic etchant, having a pH from 8–13.5,

c. reanodizing the resultant assembly at an anodizing voltage within the range of 5–10 volts for a time period sufficient to yield a second oxide film ranging up to 200 Angstroms, and

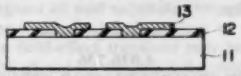
d. stripping the second oxide film with a basic etchant having a pH from 8–13.5 by immersion in the etchant for a time period sufficient to remove only the grown second oxide film.

4,026,742

PLASMA ETCHING PROCESS FOR MAKING A MICROCIRCUIT DEVICE

Katsuhiro Fujino, 83-3, Nishi Hassaku-cho, Midori, Yokohama, Japan

Continuation of Ser. No. 466,717, May 3, 1974, abandoned, which is a continuation-in-part of Ser. No. 417,542, Nov. 20, 1973, abandoned. This application Oct. 16, 1975, Ser. No. 622,862
Int. Cl.² C23F *1/02*
U.S. Cl. 156—643 **4 Claims**



1. A method of making a microcircuit on a semiconductor substrate comprising the steps of:

covering said semiconductor substrate with an insulating film;

photoetching said insulating film at desired locations to form windows therein exposing the said semiconductor substrate;

forming a reactive electrically conductive metal layer selected from the group consisting of tungsten, molybdenum, rhenium, osmium and iridium covering said insulating film and extending through said windows for covering the exposed semiconductor substrate;

forming a mask layer of photoresist in a desired pattern on said reactive electrically conductive metal layer;

contacting said semiconductor substrate with a plasma composed only of a halogenated gas consisting essentially of a perhalogenated organic compound containing fluorine atoms generated by a high-frequency electromagnetic field in an inert carrier gas under a reduced pressure of about 0.10 to0.55 mm Hg, thereby converting said reactive electrically conductive metal of those areas which are not covered with said mask layer to a metal fluoride and removing said metal fluoride; and

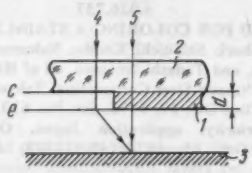
removing said photoresist mask layer with a gas containing oxygen in a plasma state to form a wiring layer of the reactive electrically conductive metal layer remaining on said insulating film.

4,026,743

METHOD OF PREPARING TRANSPARENT ARTWORKS

Gennady Nikolaevich Berezin, 103479, korpus 905, kv. 135; Valery Nikolaevich Gurzheev, 103498, korpus 406, kv. 56; Vladimir Ivanovich Zakharov, 103498, korpus 440, kv. 188; Arkady Viktorovich Nikitin, 103498, korpus 447, kv. 61, and Robert Arnoldovich Suris, Onezhskaya ulitsa, 53, korpus 1, kv. 105, all of Moscow, U.S.S.R.

Filed June 24, 1976, Ser. No. 699,439
Int. Cl.² C03C *15/00*
U.S. Cl. 156—653 **1 Claim**



1. A method of preparing transparent artworks comprising the following steps:

taking a substrate transparent to actinic light;

forming, in the near surface portion of said substrate, a masking layer translucent to said actinic light; and

making a predetermined topological relief pattern by way of local layer-to-layer removal of the material on the side of said masking layer with concurrent measurement of the optical phase difference between actinic light rays passing through said masking layer and transparent portion of said artwork, until the geometrical relief of said pattern becomes deep enough to ensure said optical phase difference which is a multiple of 2π.

4,026,744

GLASS CORD ADHESIVES COMPRISING VINYL PYRIDINE TERPOLYMER/LIGNIN SULFONATE-RESORCINOL-FORMALDEHYDE REACTION PRODUCT; METHOD OF USE AND COMPOSITE ARTICLE

Otto C. Elmer, Akron, Ohio, assignor to The General Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 542,974, Jan. 22, 1975. This application Oct. 18, 1976, Ser. No. 733,610

Int. Cl.² B29H *5/02*; **C08L** *9/08, 61/12, 97/00*

U.S. Cl. 156—110 A **8 Claims**

1. A method for adhering a reinforcing element to a vulcanized conjugated diene rubber compound which comprises treating said element with a composition comprising an aqueous alkaline dispersion of from about 10 to 30% by weight (as dry solids) of a mixture of 100 parts of a rubbery vinyl pyridine terpolymer containing about 50 to 95% of a conjugated diolefin, about 5 to 40% of vinyl pyridine and about 0 to 40% of a styrene; about 1.0 to 30 parts of a lignin sulfonate, resorcinol and formaldehyde reaction product; and heat treating said element to remove the water and to heat set the solids from said composition and to deposit on said element from said composition a total of from about 2 to 30% by weight (solids), said heat treatment being conducted at temperatures of from about 300° to 500° F. for from about 30 to 150 seconds, cooling said treated element, combining said cooled treated element with an unvulcanized vulcanizable rubber consisting essentially of conjugated diene as the major elastomer component, and vulcanizing the same.

4,026,745

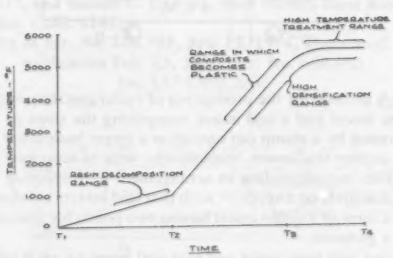
HIGH TEMPERATURE CONSOLIDATION PROCESS

Donald M. Hatch, Huntington Beach, and Richard J. Larsen, Torrance, both of Calif., assignors to Hitco, Irvine, Calif.

Filed Mar. 10, 1975, Ser. No. 556,889

Int. Cl.² B32B *31/00*

U.S. Cl. 156—155 **26 Claims**



1. A method of making a high density carbon-carbon composite comprising the steps of:

forming a laminate of organic resin impregnated layers of carbon material;

at least partially curing the organic resin;

heating the laminate in the presence of increased pressure through a temperature range to substantially decompose the resin, said heating occurring at a first rate which provides relatively rapid decomposition of the resin without accompanying delamination of the laminate; and

thereafter continuing to heat the laminate at a second rate greater than the first rate in the presence of increased pressure to a temperature higher than said temperature range and at least high enough to provide substantial softening of the laminate.

4,026,746

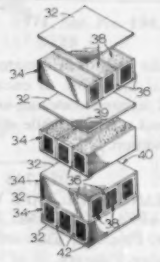
METHOD OF MANUFACTURING AN OPEN-CELLED CERAMIC ARTICLE

Raymond L. Straw, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Sept. 13, 1976, Ser. No. 722,978

Int. Cl.² B32B *31/00*

U.S. Cl. 156—155 **9 Claims**



1. A method of manufacturing an open-celled ceramic article, said method comprising the steps of:

forming a ceramic-based mixture into a plurality of sheets of wall-forming members, said mixture comprising an elastomeric binding material and silicon nitride powder;

independently forming a disintegratable filler mixture into a plurality of wall support members, said mixture comprising an elastomeric binding material and graphite powder;

applying a protective coating so as to cover the surfaces of said wall support members, said coating being chemically inert with respect to said wall-forming members and to said wall support members, and comprising a mixture of an elastomeric binding material and a material which is inert with respect to said filler mixture and to said ceramic based mixture under the temperature and pressure conditions of the method;

assembling said wall-forming members and said coated wall support members in contiguous relation to provide a relatively solid structure with said wall-forming members being disposed in edgeward contact with each other to form a plurality of joints therebetween;

heating said structure and permitting said support members and said coating to partially decompose while still bracing said wall-forming members and causing said wall-forming members to harden and said joints to fuse in a predetermined pattern; and,

removing the remainder of said partially decomposed support members to provide a plurality of accurately-shaped openings in the ceramic article.

4,026,747

COMPOSITE TUBING

John Z. DeLorean, Bloomfield Hills, and Chauncey L. Dirks, Metamora, both of Mich., assignors to John Z. DeLorean Corporation, Bloomfield Hills, Mich.

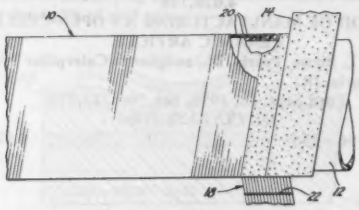
Division of Ser. No. 545,683, Jan. 30, 1975. This application Dec. 15, 1975, Ser. No. 640,503

Int. Cl.² B65H *81/00*

U.S. Cl. 156—171 **2 Claims**

1. The method of making a composite tubular structure comprising longitudinally moving a rigidified continuous tubular core member, impregnating a strip of open-cell resilient

foam material with a thermosetting resinous material, wrapping said impregnated foam strip about said core member, wrapping a layer of reinforcing elements about said foam material, urging said reinforcing elements radially inwardly to compress said foam material thereby causing said resinous



material to fill the cells of said materials and to expel excess resinous material therefrom to encapsulate said reinforcing elements in said resinous material, and applying heat to hardened said resinous material while maintaining said foam in a compressed condition.

4,026,748

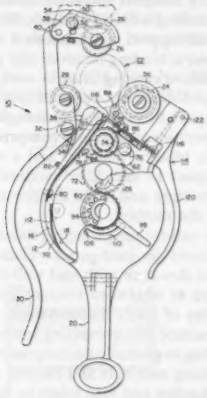
PORTABLE HAND TOOL TAPE WRAPPING METHOD, APPARATUS AND ARTICLE

Walter R. Wise, Pittsford; Ellsworth J. Allen, Newark, and Donald K. Fisher, Palmyra, all of N.Y., assignors to Garlock Inc., Palmyra, N.Y.

Continuation-in-part of Ser. No. 402,482, Oct. 1, 1973, abandoned. This application July 3, 1975, Ser. No. 592,909

Int. Cl.² B65H *81/00*; B32B *31/00*

U.S. Cl. 156—187 **42 Claims**



1. A portable hand tool for wrapping a male threaded fitting comprising:

a. a portable tool case;

b. means for rotatably supporting a roll of wrapping tape on said case;

c. a threaded support start roller rotatably mounted on said case at a stationary location thereon relative to said case;

d. means on said case for clamping male threads of a fitting against said start roller;

e. means mounted on said case for feeding a distal end of said tape in-between said start roller and a fitting clamped thereto, said feeding means including a lever on the outside of said case located for manual actuation for feeding a distal end of said tape in-between said start roller and a fitting clamped thereto, whereby upon manually rotating said case around a stationary fitting, said tape is wrapped around the male threads of a fitting; and

f. means mounted on said case for cutting said tape, said cutting means including a lever on the outside of the case located for manual actuation for cutting said tape.

31. A method for wrapping male threads of a fitting with tape comprising:

a. providing a portable hand tool having a portable tool case, a roll of tape, a rotatable threaded support start roller in fixed position on said case, and means for manually clamping said fitting against said start roller,

b. placing said fitting against said start roller and manually moving said clamping means against said fitting to clamp it between said clamping means and said start roller,

c. manually feeding an end of said tape toward and into said contact with a joint between said fitting and said start roller by manually moving a tape feeding lever on the outside of said case, said feeding step including placing said tape under a compressive force toward said fitting, and

d. manually rotating said case around said fitting for wrapping said tape onto said male threads.

4,026,749

METHOD AND APPARATUS FOR THE MANUFACTURE OF COLLAR-INSERTS AND BASE-PLUS SEAL-INSERTS FOR PERFORMANCE OF THIS METHOD

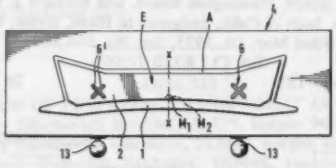
Antonius Friedrich Appelhans; Felix Franz Robers, and Ulrich Stemick, all of Nordhorn, Germany, assignors to Nino Aktiengesellschaft, Nordhorn, Germany

Filed Feb. 5, 1976, Ser. No. 655,517

Claims priority, application Germany, Feb. 6, 1975, 2504917

Int. Cl.² B32B *31/00*

U.S. Cl. 156—252 **11 Claims**



1. A method for the production of collar inserts comprising a base insert and a seal insert, comprising the steps of

forming by a stamp out operation a larger base insert and a smaller seal insert, respectively, with at least two truing slits, corresponding in arrangement to respective truing mandrels on a support, such that said inserts are shaped in a form of a collar insert having two points for the collar of a garment,

laying said base insert and said seal insert on each other on the support aligned with the truing slits guided-in on the corresponding truing mandrels, respectively, with a substantially symmetric uniform edge spacing of the edges of said base insert and said seal insert relative to each other, and thereafter

introducing the support together with the base insert and the seal insert lying aligned thereon in a sealing press,

sealing said inserts in said sealing press with the simultaneous retracting of said truing mandrels from said slits, and

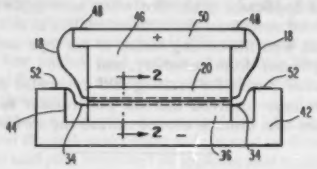
inserting the sealed inserts between material sides of a double layer collar.

4,026,750

SHEATHED SOFT-FEEL HANDLE WITH CONCEALED LAPPED ENDS AND METHOD OF MAKING SAME

Marton J. Szabo, Westmont, N.J., assignor to P.H.C. Industries, Inc., Camden, N.J.

Division of Ser. No. 641,614, Dec. 17, 1975. This application July 6, 1976, Ser. No. 702,693
Int. Cl.[2] B29C *19/04*
U.S. Cl. 156—273 9 Claims



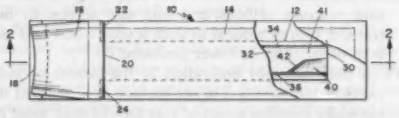
1. A method of making a handgrip for a handle comprised of forming a first discrete elongated member by surrounding a first core including an electrically conductive member with a first sheath and overlapping the longitudinal ends of the first sheath adjacent the conductive member, forming a second discrete elongated member by surrounding a second core including a second electrically conductive member with a second sheath having longitudinal ends adjacent the second conductive member, assembling the first and second discrete members by placing them against each other with the overlapping longitudinal ends of the first sheath abutting the longitudinal ends of the second sheath, removably and electrically attaching the first and second conductive members to positive and ground electrodes respectively, applying a punch to the assembled discrete members and applying a high frequency alternating current between the electrodes for a time sufficient to seal the overlapped ends of the first sheath to each other and to the longitudinal ends of the second sheath to bond the discrete members together and conceal the overlapped sealed sheath ends.

4,026,751

METHOD AND APPARATUS FOR TEMPERATURE PROBE COVER WITH PROVISION FOR SANITARY DISPOSAL

Charles F. Fowler, 5157 Park West Ave., San Diego, Calif. 92117, and Samuel G. Dawson, 1869 Hidden Mesa Road, El Cajon, Calif. 92020

Division of Ser. No. 488,705, July 15, 1974, abandoned. This application Feb. 23, 1976, Ser. No. 660,653
Int. Cl.[2] C09J *5/00*
U.S. Cl. 156—306 4 Claims



1. A method of manufacturing probe covers, the probe covers comprising layers of heat bondable sheet material, to obtain an elongated inner sheath with an openable end and a closed end, and having a probe end engagement section adjacent the closed end that engages the probe end during probe removal to turn said inner sheath inside out comprising the steps of:

placing layers of sheet material on a platen,

pressing a welding head incorporating a heated shoe onto said sheet material and bonding said layers together to form a tubular probe cover inner sheath having a generally triangularly shaped bonded area adjacent the closed end of the inner sheath,

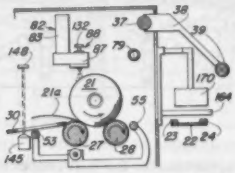
said step of pressing said heated shoe is characterized by a pressure gradient which generally increases with widthwise distance, from the longitudinal edges of said probe cover inner sheath.

4,026,752

TAIL SECURING APPARATUS

Ellsworth A. Hartbauer, Concord, and Rudolf R. Weis, Antioch, both of Calif., assignors to Crown Zellerbach Corporation, San Francisco, Calif.

Filed Nov. 1, 1971, Ser. No. 194,159
Int. Cl.[2] B32B *31/00*
U.S. Cl. 156—457 7 Claims



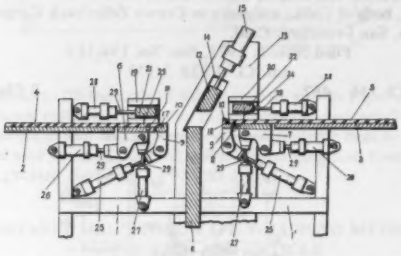
1. Apparatus for securing the unaffixed tail of an elongated roll product to a convolution thereof underlying such tail, comprising: frame structure provided by said apparatus, roll-rotating mechanism supported by said frame structure and defining an operating station whereat said mechanism is adapted to freely support said roll product and continuously rotate said roll product about its longitudinal axis in a direction tending to wind said tail thereabout, means for positioning said roll product in an infeed position in transversely spaced relation with said operating station, selectively operable pusher mechanism for displacing said roll product from the infeed position thereof into said operating station, tail-accelerating means located at said operating station for unwinding such tail as the roll product is continuously rotated, selectively fixedly positioned longitudinally-extending spatially-fixed adhesive applicator structure including a plurality of spatially fixed dispensing nozzles disposed in longitudinally spaced relation along said apparatus and each being operative to eject a predetermined quantity of adhesive, said adhesive applicator structure carried by said frame structure at said operating station and in close proximity to said rotating roll product for directly depositing substantially aligned and discrete tail-securing adhesive spots at predetermined locations on the underlying convolution of such roll product during rotation thereof, said discrete adhesive spots adapted to be positioned between said tail and said underlying convolution when the tail is rewound due to the continuous rotation of the roll product by said roll-rotating mechanism, and selectively operable ejection mechanism essentially independent of said roll-rotating mechanism for displacing said roll product from the operating station after said tail has been rewound thereon and adhesively secured to the convolution underlying the same, said adhesive applicator structure comprising a plurality of separate adhesive applicator modules disposed in spaced apart longitudinal succession along said operating station and each equipped with a plurality of spatially-fixed dispensing nozzles disposed in longitudinally spaced relation, and means adjustably securing each of said modules to said frame structure to enable the relative longitudinal positions of the patterns of adhesive respectively deposited by said modules to be altered to accommodate variations in the lengths of the individual rolls into which such elongated roll products may be subdivided.

4,026,753

APPARATUS FOR BUTT CONNECTION OF PLIES FORMED OF PLASTIC DEFORMABLE MATERIAL, ESPECIALLY RUBBERIZED STEEL CORD PLIES

Gerhard Printz, Vienna, and Ralf Haase, Vienna-Mauer, both of Austria, assignors to Semperit Aktiengesellschaft, Vienna, Austria

Division of Ser. No. 417,398, Nov. 19, 1973, Pat. No. 3,933,565. This application Feb. 20, 1975, Ser. No. 551,104
Claims priority, application Switzerland, Nov. 20, 1972, 16846/72
Int. Cl.² B31F 5/00; B32B 31/00; B30B 15/06
U.S. Cl. 156—502 6 Claims



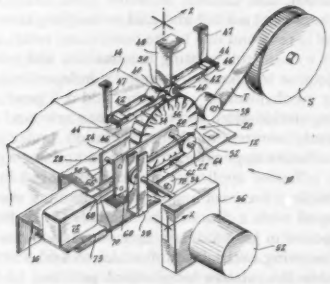
1. In an apparatus for the butt connection of plies formed of plastic deformable material and having cut surfaces to be butt connection to one another, comprising means for positioning the confronting cut surfaces of said plies to be butt connected in slight overlapping relationship forming a butt contact, at least one contact beam which can be displaced at an inclination against the butt contact of the plies, said contact beam having a ply contact surface which extends over the entire line of butt contact of the plies, means for guiding said one contact beam for displacement at an inclination against the plies in order to relatively move the plies towards one another, means for displacing said one contact beam in order to apply an inclined directed force at said plies, said contact beam having a lengthwise axis located in a plane which is inclined with respect to the butt connection of the plies containing the cut surfaces.

4,026,754

DOUBLE ADHESIVE TAPE APPLYING APPARATUS

John J. Bogdanski, Stamford, and Harold Silverman, Norwalk, both of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Filed July 12, 1976, Ser. No. 704,281
Int. Cl.² B32B 31/00
U.S. Cl. 156—521 11 Claims



1. An apparatus for applying tape, having adhesive on both of its faces, to a surface, said apparatus comprising:

A. an applicator drum having
1. a cylindrical periphery for receiving the tape by contact with one of the tape faces, and
2. at least one slot extending transversely to said periphery,

B. means for moving said applicator drum
1. toward the surface with the other of the tape faces in contact therewith;
2. away from the surface,

C. cutting means registrable in interfitting engagement with said applicator drum slot when said applicator drum is moved away from the surface, relative to and into cooperation with the cutting means to cut tape received on the applicator drum periphery; and

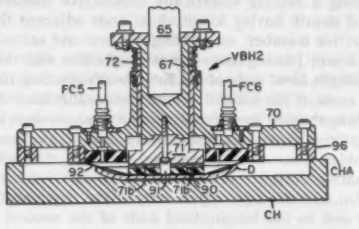
D. motor means for rotating said applicator drum to position tape received thereon for transfer to the surface when said drum is moved toward the surface.

4,026,755

DECAL APPLYING

Mijo A. Gossie, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Division of Ser. No. 586,241, June 12, 1975, Pat. No. 3,960,633. This application Feb. 9, 1976, Ser. No. 656,375
Int. Cl.² B65C 9/14, 9/28
U.S. Cl. 156—538 1 Claim



1. In combination with an open top horizontally disposed chuck embodying a cavity holding a dish-like article whose upwardly facing surface is to be decorated, the apparatus comprising;

I. a depending and vertically actuable vacuum and blow head assembly above said chuck and including, a lower head portion having a larger diameter than said chuck and a downwardly disposed face of a resilient material, and having vacuum and compressed air orifices therein for alternatively supplying vacuum and compressed air through said face, and a stem support portion extending upwardly from said head portion;

II. a stretchable silk screen covering said face of said head portion of said assembly;

III. first actuable valve means for supplying vacuum through said vacuum orifices and said silk screen to hold the transfer film of a decal to such screen when said assembly is in other than its lower position;

IV. a plug member embodied in the center of said head portion and having a lower surface of a resilient material normally forming a part of said face of such head portion, such plug member being vertically movable out of the face of said head portion and embodying a plurality of compressed air radial passages connecting with a center hole embodied in said resilient material and said center hole opening through said lower surface of such material;

V. spring means for urging said plug member to its normally retracted position within said head portion;

VI. motor means including a vertically reciprocative output shaft attached to said stem support portion of said vacuum and blow head assembly for vertical actuation of such assembly;

VII. second actuable valve means for suppling compressed

air through said compressed air orifices and through said silk screen and said radial passages and said center hole in said resilient material to blow against said transfer film when said assembly is actuated to its lower position by said motor means; and

VIII. timing means for selectively controlling actuation of said first and second valve means and the energization of said motor means; whereby;

IX. when said assembly is actuated downwardly by said motor means and an outer annular part of said face of said head portion contacts the brim of said chuck, said plug member continues downwardly against the force of said spring means to stretch said silk screen and press said transfer film against said surface of said dish-like article while said first valve means are actuated to terminate said vacuum through said screen and said second valve means are actuated to supply compressed air through such screen and through said center hole in said resilient material to aid said plug memeber in applying said transfer film to said surface of said article.

4,026,756

APPARATUS FOR REPAIRING ELONGATED FLEXIBLE STRIPS HAVING DAMAGED SPROCKET FEED HOLES ALONG THE EDGE THEREOF

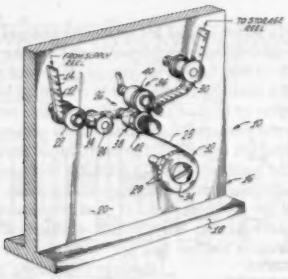
James S. Stanfield, 1236 Amherst St., Apt. No. 1, Los Angeles, Calif. 90025, and Paul W. Trester, 2312 Ninth St., Olivenhain, Calif. 92024

Filed Mar. 19, 1976, Ser. No. 668,613

The portion of the term of this patent subsequent to May 26, 1993, has been disclaimed.

Int. Cl.² B32B *31/04, 35/00*

U.S. Cl. 156—554 **16 Claims**



7. An apparatus for repairing substantial continuous lengths of elongated flexible strips having a relatively large number of damaged sprocket feed hole perforations along one side edge portion thereof by laminating thereto an elongated flexible repair tape carrying preformed replacement feed hole perforations therein, said apparatus comprising:

means for sequentially aligning each preformed feed hole carried by said tape with each successive feed hole location along said side edge portion of said strip in a manner such that each of said preformed feed holes in said tape substantially coincides with the corresponding feed hole location on said strip, said aligning means including a roller carrying a plurality of upstanding teeth each having a cross-sectional shape dimensioned to substantially fill the space defined by a replacement feed hole;

and means for sequentially bonding said tape to said side edge portion of said strip while maintaining said aligned condition, said bonding means including a pressure roller biased toward engagement with said sprocket roller and having a peripheral groove adapted to receive said teeth of said sprocket roller,

whereby said sprocket roller and said pressure roller cooperate to laminate said tape to said strip with each of said preformed feed holes substantially coinciding with each of said damaged feed hole locations along said strip.

4,026,757

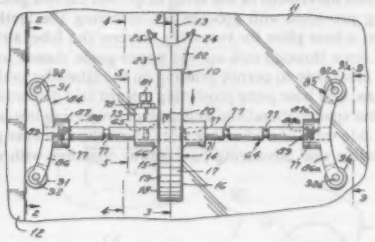
TAPE DISPENSER AND APPLICATOR

Harry J. Crawford, 22955 Glenmoor Heights Drive, Farmington, Mich. 48024

Filed Mar. 15, 1976, Ser. No. 666,869

Int. Cl.² B44C *7/00;* **B05C** *11/00*

U.S. Cl. 156—575 **7 Claims**



1. In a tape dispenser capable of applying and sealing electricaly conductive tape in an unbroken application on a flat surface along straight paths around the perimeter of the surface, the combination, comprising:

a. a housing having a tape storage chamber, including a tape roll supporting means for rotatably supporting a roll of tape in said chamber;

b. a roll of tape rotatably mounted on said tape roll supporting means;

c. said housing having an extension on the front side thereof through which is formed a tape dispensing path, and which extension has on its outer face a tape discharge opening for discharging the tape from the housing and applying it to a flat surface;

d. a pressure means operatively carried on said housing extension in a position above said opening for pressing said tape on a flat surface as it is discharged from the housing extension opening; and,

e. guide means adjustably carried by said housing extension for guiding the dispenser over a flat surface along a predetermined course including straight paths at right angles to each other;

f. an arcute padded pressure means carried on the lower front face edge of the housing extension capable of positioning the tape so as to complete a right angle turn while holding the same margin around the perimeter of the surface when making right angled turns in applying the tape on a flat surface.

4,026,758

PORTABLE LABELLING MACHINE

Yo Sato, 17-8, 4-chome, Izumi, Suginami, Tokyo, Japan

Continuation of Ser. No. 377,777, July 9, 1973, abandoned. This application Dec. 4, 1975, Ser. No. 637,767

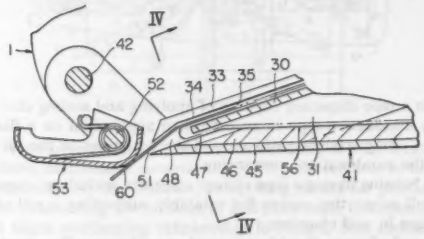
Claims priority, application Japan, Oct. 5, 1972, 47-99441

Int. Cl.² B41F *1/08*

U.S. Cl. 156—540 **6 Claims**

1. A labelling machine comprising a casing having side walls, a manual grip integrally formed with said casing, a lever pivotally supported by said casing for swingable movement through a predetermined angle within said casing, printing means mounted on and driven by said lever to print a desired inscription on a continuous label strip consisting of a series of labels releasably placed on a common backing strip, advancing means including a toothed feed rotor which rotates in one direction only for advancing said label strip by an indexed movement along an advancing passageway through said casing

toward a dispensing opening of said casing by actuation of said lever, said labels being successively separated from said backing strip at the end of said passageway and being dispensed out of said dispensing opening while said backing strip is transferred rearwardly after separation of the labels therefrom by said toothed feed rotor, label affixing means for affixing a label separated from the backing strip and dispensed out of said dispensing opening onto a desired article, guide means for defining said advancing passageway, an openable bottom plate to facilitate loading of the continuous label strip, said guide means comprising a curved upper guide means disposed above said rotor to guide said label strip together with said rotor for indexed movement of the label strip, said curved guide means being provided with grooves for receiving the teeth of said rotor, a base plate for receiving thereon the label strip fed by said rotor through said curved upper guide means to support said label strip to permit printing on the labels by said printing means, said base plate projecting toward said dispensing opening but spaced therefrom and shelves projecting inwardly from said side walls of said casing so as to overlie said base plate and to define said advancing passageway together with said base



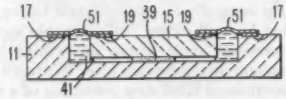
plate, said shelves having front ends terminating at said dispensing opening; bottom guide means on said openable bottom plate of the casing, said bottom guide means having front ends terminated at a position adjacent the front ends of said shelves and facing the front end of said base plate while being tapered downwardly to define with said base plate a narrow passageway for rearward travel of the backing strip toward said rotor; said openable bottom plate having a tapered front end which defines together with the front ends of said shelves a narrow gap at the front end of said base plate whereby a hairpin passageway is formed in said narrow gap by the front end of said base plate, the front ends of said shelves and the front ends of said bottom guide means, said hairpin passageway being positioned to sharply bend the backing strip backwardly and introduce said backing strip into the narrow passageway formed between the front end of said base plate and the front ends of said bottom guide means thereby to define and retain a constant slack loop in said backing strip and to extend the backing strip rearwardly so as to be engaged with the underside of said rotor to dispense the backing strip backwardly over a length corresponding to the length of a label.

4,026,759

METHOD OF MAKING INGROWN LEAD FRAME WITH STRAIN RELIEF

Donald Gene McBride, Binghamton, and Philip Harold Pallady, Windsor, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 11, 1975, Ser. No. 639,952
Int. Cl.² B29C *17/08*
U.S. Cl. 156—632 **6 Claims**



1. A method for providing interconnections between respective sites on two adjacent substrates, comprising the steps of:

placing a curved, non-swelling solvent soluble material between the respective interconnection sites on said adjacent substrates, said solvent soluble material having a smooth surface and being adapted to accept a plate of conductor material;

defining a desired interconnection pattern on said solvent soluble material and the sites on said substrates;

depositing a conductor material in the defined interconnection pattern to thereby establish the desired curved interconnecting leads between respective sites on said two adjacent substrates; and

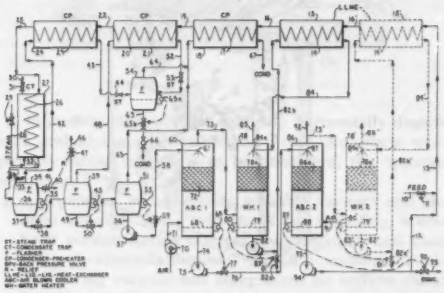
dissolving and removing the solvent soluble material, thereby leaving the curved interconnecting leads suspended between said two substrates, the curve in each lead providing stress relief thereto.

4,026,760

PROCESSES OF CONCENTRATING SOLUTIONS BY MULTISTAGE SPRAYING

Carl A. Connally, Tulsa, Okla., assignor to Ozark-Mahoning Company, Tulsa, Okla.

Division of Ser. No. 516,150, Oct. 21, 1974, Pat. No. 3,985,609. This application July 22, 1976, Ser. No. 707,490
Int. Cl.² B01D *1/16, 1/14, 1/00*
U.S. Cl. 159—48 L **8 Claims**



1. A process of concentrating a solution using steam as the basic heat source to heat the solution to be concentrated comprising:

passing the solution to be concentrated through a series of indirect heat exchanging steps in order to raise the temperature thereof, while maintaining the solution to be concentrated under sufficient back pressure to retain same in liquid form;

passing the heated solution to a flash evaporation step whereby to separate same into liquid and vapor phases;

passing the liquid phase from the flashing step to a first evaporative cooling step wherein same is distributed in counterflow relationship with air in a first cooling tower;

passing the vapor phase from said flash evaporation step in indirect heat exchange with the solution to be concentrated in one of said indirect heat exchanging steps thereof;

passing the once cooled liquid bottoms from the first cooling tower to a second evaporative cooling step wherein same is distributed in counterflow relationship with air in a second cooling tower; and

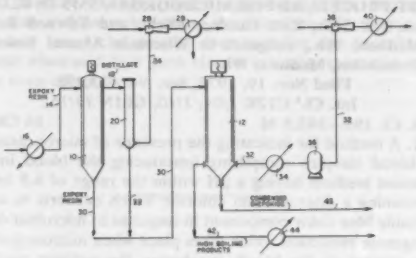
passing a portion of the liquid bottoms from the second cooling tower from the system as product.

4,026,761

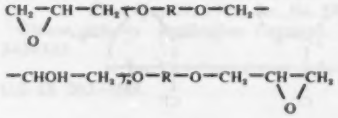
PROCESS FOR THE PREPARATION OF DIEPOXIDES

Silvio Vargiu, Casatenovo, (Como); Giancarlo Crespolini, Bergamo, and Giulio Grazzini, Milan, all of Italy, assignors to Societa' Italiana Resine S.I.R. S.p.A., Milan, Italy

Filed July 8, 1976, Ser. No. 703,343
Claims priority, application Italy, July 8, 1975, 25176/75
Int. Cl.[2] B01D 1/22
U.S. Cl. 159—49 9 Claims



1. A method for recovering a diepoxide having a viscosity of from 3,000 to 4,600 cps at 25° C, defined by means of the formula:



(I)

wherein R is the bisphenyl radical of bisphenol-A (HO—R—OH) and n has an average value not exceeding 0.03, from a liquid epoxy resin having a viscosity of from 7,000 to 40,000 cps at 25° C, defined by means of formula (I) wherein n has an average value of from 0.07 to 0.30, characterized by removing in a first evaporation step the low-boiling substances from said epoxy resin at a pressure of from 0.1 to 1 mm Hg and at a temperature of from 165° to 200° C, and distilling off said diepoxide from the thus treated epoxy resin, in a second evaporation step, at a pressure of from 0.1 to 0.005 mm Hg and at a temperature not exceeding 240° C, the overall residence time of said epoxy resin in said first and second evaporation steps not exceeding about 100 seconds.

4,026,762

USE OF GROUND LIMESTONE AS A FILLER IN PAPER

Harry D. Bauman, Glen Rock, Pa., assignor to P. H. Glatfelter Co., Spring Grove, Pa.

Filed May 14, 1975, Ser. No. 577,340
Int. Cl.[2] D21D 3/00; C04B 31/02
U.S. Cl. 162—181 A 6 Claims

1. A mixed filler material for addition to paper furnish to provide substantially the same scattering coefficient in paper as 100% precipitated calcium carbonate comprising aboout 5 to about 35 wt.% ground limestone particles having an average particle diameter by weight determined by centrifugal sedimentation of 2 microns or less, at least 95 wt.% of said ground limestone particle having an equivalent spherical diameter of 10 microns or less, and about 95 to 65 wt.% precipitated calcium carbonate particles having an average particle diameter of less than 1 micron.

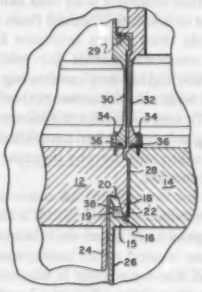
2. Mixed filler material as claimed in claim 1 wherein the amount of ground limestone is about 10 to about 25 wt.% and the amount of precipitated calcium carbonate is about 90 to about 75 wt.%.

4,026,763

LIQUID-METAL DIP SEAL WITH PNEUMATIC SPRING

Allan M. Poindexter, Pleasant Hills, Pa., assignor to The United States Energy Research and Development Administration, Washington, D.C.

Filed Apr. 12, 1976, Ser. No. 675,845
Int. Cl.[2] G21C 13/06
U.S. Cl. 176—87 2 Claims



1. In a liquid-metal cooled nuclear reactor containing cover gas and which includes a reactor vessel head containing small and large rotating plugs, the small rotating plug being nested within the large rotating plug and defining an isolated plug annulus between the plugs wherein the annulus is sealed at the top by an inflatable seal and at the bottom by the liquid-metal dip seal, the dip seal comprising:

a trough on an inner periphery of said large rotating plug and having a bottom formed by a flange extending from the inner periphery of the large rotating plug, a side wall formed by the periphery of the large rotating plug above the trough bottom, and another side wall attached at a right angle to the edge of the flange away from the large rotating plug and extending a distance upwardly therefrom;

a seal blade pendently supported from the periphery of a larger diameter section of the small rotating plug, and extending downwardly into the trough and separating the trough into a wide leg and a narrow leg substantially different in width, each in communication with the other underneath the seal blade, the wide leg also being in communication with the cover gas, and the narrow leg also being in communication with the isolated plug annulus;

a liquid metal in the trough which submerges a portion of the seal blade; and

a constant mass of inert gas in the isolated plug annulus, the gas being in communication with the surface of the liquid metal in the narrow leg, whereby

when the cover gas pressure increases and displaces liquid metal from the wide leg to the narrow leg, thereby causing an increase in the level of the narrow leg greater than the decrease in level of the wide leg, the constant mass of inert gas in the isolated plug annulus will be compressed and its pressure increased, thus exerting a greater restoring force on the surface of the liquid metal in the narrow leg and resisting any further decrease in the level of liquid metal in the wide leg.

4,026,764

DRY ISOMERASE ACTIVATION

Thomas L. Hurst, Decatur, Ill., assignor to A. E. Staley Manufacturing Company, Decatur, Ill.

Filed Mar. 20, 1975, Ser. No. 560,658
Int. Cl.[2] C12D 13/00
U.S. Cl. 195—31 F 18 Claims

1. A method for converting a dry isomerase to a hydrated

isomerase to increase isomerase activity and enhance the effectiveness of the hydrated isomerase in an aqueous monosaccharide isomerization reaction, said method comprising initially pretreating a dry isomerase by contacting the dry isomerase with an aqueous activating solution comprised of water and at least one metal ion activator for said isomerase at a molarity substantially greater than the metal ion activator molarity required to provide optimum fructose yields in a glucose isomerization reaction with said isomerase, in combination with at least one solute selected from the group consisting of water-soluble thiol group activator for said isomerase and isomerizable monosaccharide for said isomerase in an amount greater than 0.5M, and continuing the pretreatment of said isomerase with said aqueous activating solution for a period of time sufficient to permit the isomerase to imbibe the aqueous activating solution and to saturate the isomerase with said activating solution and thereby increase the isomerization activity of said isomerase.

11. In a process for isomerizing an aqueous monosaccharide solution to an isomerized syrup product wherein an isomerase which has been previously dried and thereafter converted to hydrated isomerase is used as an isomerase in the isomerization reaction, and the isomerase is characterized as having enhanced isomerase activity when the isomerization reaction is conducted in the presence of at least one metal ion activator at an isomerization temperature in excess of 50° C., the improvement which comprises the steps of:

A. pretreating the isomerase by saturating the isomerase with an aqueous solution comprised of at least one metal ion activator at a molarity substantially greater than the metal ion activator molarity required to provide optimum fructose yields in a glucose isomerization reaction with said isomerase, in combination with at least one solute selected from the group consisting of water-soluble thiol group activator for said isomerase and isomerizable monosaccharide for said isomerase in an amount greater than 0.5M, and continuing the pretreatment of said isomerase in said aqueous solution for a period of time sufficient to saturate the isomerase with the aqueous pretreating solution and substantially increase the isomerase activity of said isomerase, and

B. isomerizing an aqueous monosaccharide solution with the pretreated isomerase to provide an isomerized syrup product,

with the molarity of said metal ion activator in pretreatment step (A) being substantially greater than the molarity of the metal ion activator employed in the isomerization of the monosaccharide in step (B).

4,026,765

PROCESS FOR THE PRODUCTION AND GERMINATION OF ENTOMOPHTHORA RESTING SPORES

Richard S. Soper, Jr., Orland, Maine, assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Apr. 30, 1976, Ser. No. 681,962
Int. Cl.² C12B *1/00*
U.S. Cl. 195—81 **9 Claims**

1. In a process for producing Entomophthora resting spores wherein a standard egg yolk media is inoculated with a culture of the Entomophthora spore, the improvement comprising adding to and mixing with the egg yolks during preparation of the media, a molten Sabourad maltose agar.

4,026,766

FERMENTATION PROCESS

Koji Tomita, Kawasaki; Seikichi Kobaru, Narashino; Minoru Hanada, Tokyo, and Hiroshi Tsukiura, Mitaka, all of Japan, assignors to Bristol-Myers Company, New York, N.Y.

Filed May 5, 1976, Ser. No. 683,585
Int. Cl.² C12D *9/00*
U.S. Cl. 195—96 **4 Claims**

1. A process for the production of capreomycin which comprises aerobically cultivating *Dactylosporangium variesporum* strain D409-5 having the identifying characteristics of ATCC 31203, or a capreomycin-producing mutant thereof, in an aqueous nutrient medium containing assimilable sources of carbon and nitrogen until a substantial amount of capreomycin is produced by said organism in said culture medium.

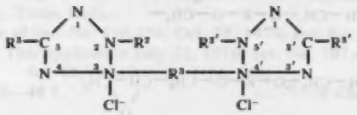
4,026,767

TEST PROCEDURE FOR MICROORGANISMS IN BLOOD

Chun-Nan Shih, East Lansing, Mich., and Edward Balish, Madison, Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.

Filed Nov. 19, 1975, Ser. No. 633,278
Int. Cl.² C12K *1/04, 1/10;* G01N *33/16*
U.S. Cl. 195—103.5 M **16 Claims**

1. A method for indicating the presence of microorganisms in blood samples comprising introducing the blood into a nutrient medium having a pH within the range of 6.8 to 7.5 containing a ditetrazolium chloride which converts to a detectable blue color component in response to microbial dehydrogenase reduction which takes place when microorganisms are present in the blood, incubating the nutrient medium contained in the sample for a short period of time and then examining the incubated product to detect the presence of microorganisms as indicated by a blue color formed by reduction of the ditetrazolium chloride in which the ditetrazolium chloride has the general formula



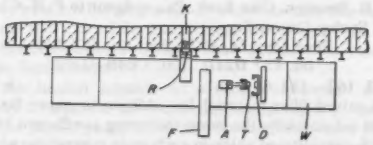
in which R^2, $R^{2'}$, R^5, $R^{5'}$ are aromatic groups which may be substituted on the meta or para position with groups selected from the group selected from C_1 to C_8 alkoxy, nitro and halogen groups, R^3 is biphenylene or C_1 to C_8 alkoxy biphenylene.

4,026,768

DOOR EXTRACTING AND CLEANING MACHINE FOR COKE OVENS

Hans Bähnsch, Breitscheid, and Hans-Jürgen Kwasnik, Wanne-Eickel, both of Germany, assignors to Dr. C. Otto & Comp. G.m.b.H., Bochum, Germany

Filed June 2, 1975, Ser. No. 583,034
Claims priority, application Germany, May 31, 1974, 2426428
Int. Cl.² C10B *25/14, 43/04, 33/14*
U.S. Cl. 202—241 **1 Claim**



1. A carriage adapted to traverse along a coke oven battery parallel to and on the coke side thereof, said carriage having a frame movable thereon parallel to the said coke side of said oven battery and said frame carrying a coke oven door extractor, a coke guide and a door jamb cleaner, said carriage also having means including parallel rails for movement of the frame along the carriage to align with a coke oven chamber in succession the door extractor, the coke guide and the door jamb cleaner, means pivotally mounting the door extractor on said frame whereby it is rotatable from a position where it is

aligned with a coke oven chamber to a position where it is perpendicular thereto, and a door frame cleaner stationarily mounted on said carriage and adapted to engage a door to be cleaned after said door extractor is perpendicular to said oven chamber and said frame has been traversed on said carriage to a position where the door engages said door frame cleaner, said coke guide being mounted on said frame intermediate said door extractor and said door jamb cleaner, the door extractor being on the side of said frame facing said door frame cleaner whereby pivotal movement of the extractor with a door thereon will move the door into alignment with said door frame cleaner, the door engaging the door frame cleaner when said door jamb cleaner is in alignment with said coke oven chamber.

4,026,769

ADJUSTABLE SEALING FRAME FOR COKE-OVEN DOOR

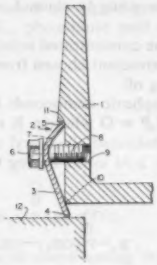
Franz Steimann, Gelsenkirchen, Horst, Germany, assignor to Didier Engineering GmbH, Essen, Germany

Filed May 29, 1975, Ser. No. 582,407

Claims priority, application Germany, June 19, 1974, 2429333

Int. Cl.² C10B *25/06, 25/16*

U.S. Cl. 202—248 **7 Claims**



1. A coke oven door sealing assembly comprising a door frame, a door element within said frame, and a sealing means attached to and extending around the periphery of said door element for providing a gas seal between said door element and said frame, said sealing means comprising:

a flexible metallic bar having a bent transverse cross sectional configuration formed by two arms joined at an apex, said apex and edges of said arms extending longitudinally of said bar;

said bar being positioned with the edge of a first of said arms sealingly contacting said frame;

said door element having a first longitudinal bearing surface sealingly contacting the edge of a second of said arms;

said door element having a second longitudinal bearing surface contacting said bar; and

a plurality of bolt means, extending through said bar at positions adjacent said apex and adjustably threaded into said door element in directions parallel to the plane thereof, for simultaneously fixing said bar to said door element and for selectively adjusting said bar in a direction perpendicular to said plane of said door element by selectively tightening and loosening said bolts and thereby increasing and reducing the angle of said apex.

4,026,770

PROCESS FOR REMOVING 1,4-NAPHTHOQUINONE FROM PHTHALIC ANHYDRIDE

Gerhard Scharfe; Rupert Wenzel, both of Leverkusen, and Wolfgang Biedermann, Krefeld, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Oct. 29, 1975, Ser. No. 627,155

Claims priority, application Germany, Nov. 13, 1974, 2453745

Int. Cl.² C07D *307/89*

U.S. Cl. 203—29 **6 Claims**

1. Process for removing 1,4-naphthoquinone from phthalic anhydride which comprises heating phthalic anhydride containing 1,4-naphthoquinone with elementary sulphur at a temperature of from 200° to 300° C. and thereafter distilling the reaction product from the heat treatment.

4,026,771

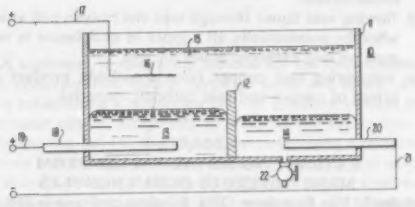
PROCESS FOR THE PURIFICATION OF METALS

John H. Wagenknecht, Kirkwood, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Oct. 30, 1975, Ser. No. 627,437

Int. Cl.² C25C *1/00, 1/22*

U.S. Cl. 204—105 R **2 Claims**



1. A method for electrochemical refining of a metal, said method including the step of immersing impure metal in an electrolyte, immersing a sample of purified metal in said electrolyte, said purified metal being physically separated by means inert ot said metal from said impure metal, and electrically connecting said metals to an electric current source such that pure metal is electrochemically and chemically dissolved from said impure metal and deposited on said pure metal, said improvement comprising the step of:

immersing a platinum electrode in said electrolyte, said electrode being an anode as is the impure metal such that the current passing from said platinum anode causes an increase of current at the cathode of pure metal in addition to the current provided by said impure metal anode said current increase being large enough to deposit the chemically dissolved metal whereby the rate of electrochemical deposition of pure metal is increased to equal the rate of electrochemical and chemical dissolution of said impure metal.

4,026,772

DIRECT ELECTROCHEMICAL RECOVERY OF COPPER FROM DILUTE ACIDIC SOLUTIONS

Paul R. Ammann, Boxford; Glenn M. Cook, Harvard, and Charles Portal, Newton, all of Mass., assignors to Kennecott Copper Corporation, New York, N.Y.

Filed July 16, 1975, Ser. No. 596,458

Int. Cl.² C25C *1/12*; C25D *17/12*; C25B *1/12*

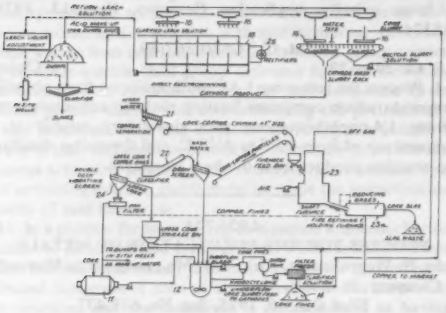
U.S. Cl. 204—106 **16 Claims**

1. In a process for recovering copper from dilute solution of pregnant liquor from a copper leaching system, the steps comprising:

a. maintaining the pH value of said liquor equal to or more acid than a barren leach solution, said liquor comprising from about 0.1 to about 20.0 gpl copper and up to about

10.0 gpl iron as ferrous iron and up to about 10.0 gpl iron as ferric iron, including incidental impurities and solvated metals associated with copper;

b. introducing said liquor into an electrolysis cell having a cathode of an electrically conductive porous material and an anode;



c. applying a current such that the current density in said cathode is from about 3 to 100 amps per square foot of cross-section;

d. flowing said liquor through said electrolysis cell at a rate whereby substantially all copper in said liquor is recovered on said cathodic material; and

e. recovering said copper from a cathode product comprised of copper and said cathodic material.

4,026,773

EXTRACTING METAL VALUES FROM MANGANIFEROUS OCEAN NODULES

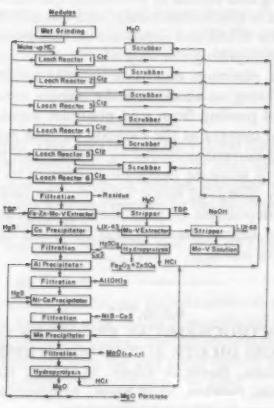
Antoine L. Van Peteghem, Olen, Belgium, assignor to Metallurgie Hoboken Overpelt, Hoboken, Belgium

Filed Jan. 14, 1976, Ser. No. 648,927

Claims priority, application Luxembourg, Jan. 17, 1975, 71669; July 11, 1975, 72958

Int. Cl.² C01G *51/00, 53/00, 45/02*; C25C *1/12*

U.S. Cl. 204—108 **19 Claims**



1. A process for extracting metal values from manganiferous ocean floor nodule ore containing at least one metal selected from the group consisting of Ni, Co, Cu, Mo, V, Fe, Al and Zn, said process comprising:

a. treating an amount of ore with hydrochloric acid containing at least 150 g HCl/liter, the amount of acid used corresponding to between 0.95 and 1.3 times the stoichiometric amount of HCl needed to transform into chlorides the metal values contained in the ore, thereby producing chlorine and starting pulp containing a solution of metal chlorides and a solid residue;

b. subjecting the starting pulp to at least 2 subsequent acidifications with HCl, each acidification being carried out by adding HCl to the pulp in an amount needed to obtain an initial HCl content in the pump of at least 150 g/l and followed by addition of fresh ore in amounts such as to obtain the HCl:ore ratio defined in step (a), thereby producing chlorine and a final pulp containing a concentrated solution of metal chlorides and a solid residue;

c. separating the solid residue from the concentrated solution in the final pump formed in step (b);

d. separating substantially all metal values except manganese and the alkali and alkaline earth metals from the concentrated solution resulting from step (c);

e. separating the manganese from the solution resulting from step (d) by treating said solution with chlorine, at least the major part of said chlorine being produced in steps (a) and (b), while maintaining the pH of the solution between 3 and 7 by addition of a neutralizing agent selected from the group consisting of MgO and $Mg(OH)_2$, at least the major part of said manganese being precipitated as $MnO_{(1+x)}$ according to the following equation when the neutralizing agent is MgO: $MnCl_2 + (1+x)MgO + xCl_2 \rightarrow MnO_{(1+x)}\downarrow + (1+x)MgCl_2$ or according to the following equation when the neutralizing agent is $Mg(OH)_2$: $MnCl_2 + (1+x)Mg(OH)_2 + xCl_2 \rightarrow MnO_{(1+x)}\downarrow + (1+x)MgCl_2 + (1+x)H_2O$ wherein X is between 0.5 and 0.7, thereby forming a solution of magnesium chloride;

f. separating the manganiferous precipitate from the magnesium chloride solution;

g. pyrohydrolyzing the magnesium chloride solution obtained in step (f) in the atomized state thereby generating the neutralizing agent and HCl; and

h. recycling the regenerated neutralizing agent to step (e) and the regenerated HCl to step (b).

3. A process according to claim **1**, wherein step (d) comprises:

a'. contacting the concentrated solution resulting from step (c) with an extractant chosen from the group of extractants consisting of:

1. organophosphoric compounds having the general formula $(RO)_3P = O$ wherein R represents an unsubstituted or substituted alkyl, aryl or aralkyl group; and

2. phosphonic acid esters having the general formula

$$R_1—\overset{\overset{O}{\|}}{P}(OR_2)—OR_3,$$

phosphonous acid esters having the general formula $R_1 — P(OR_2) — OR_3$, phosphinic acid esters having the general formula

$$R_1—\overset{\overset{O}{\|}}{P}(R_2)—OR_3$$

and phosphinous acid esters having the general formula $R_1 — P(R_2) — OR_3$, wherein R_1, R_2 and R_3 represent the same or different, unsubstituted or substituted hydrocarbon groups, said extractant being used in such an amount that the chlorides of Fe, Mo, V and Zn are simultaneously extracted, thereby producing a metal-bearing extractant and a raffinate, and separating the extractant from the raffinate;

b'. treating the raffinate formed in step (a') with H_2S, while keeping the pH of the raffinate below 2.5, thereby producing a precipitate of copper sulfide and a substantially decopperized raffinate, and separating the precipitate from the raffinate;

c'. adjusting the pH of the decopperized raffinate formed in step (b') to between 2 and 6, thereby producing a precipitate of aluminum hydroxide and a dealuminized raffinate, and separating the precipitate from the raffinate; and

d'. treating the dealuminized raffinate formed in step (c') with H_2S, while keeping the pH between 3 and 6, thereby producing a precipitate consisting substantially of Co and Ni sulfides and a manganiferous raffinate, and separating the precipitate from the raffinate.

4. A process according to claim 3 wherein:

the organophosphoric compound and the phosphonic acid ester used in step (a') are tributyl phosphate and the diisobutyl ester of isobutylphosphonic acid, respectively;

the pH in step (d') is kept between 3 and 4.5;

the vanadium in the solution resulting from step (c) is brought to the pentavalent state before said solution is contacted with an extractant in step (a'); and

the precipitate of copper sulfide obtained in step (b') is transformed into copper sulfate solution by oxidation in aqueous medium and the resulting copper sulfate solution is subjected to electrolysis.

12. A process for extracting metal values from a solution of the chlorides of Mn, Fe, Co, Cu, Ni, Mo, V, Al and Zn, said process comprising:

A. contacting the solution with an extractant selected from the group consisting of:

1. the organophosphoric compounds having the general formula $(RO)_3P=O$ wherein R represents an unsubstituted or substituted alkyl, aryl or aralkyl group; and

2. phosphonic acid esters having the general formula

$$R_1-P(OR_2)-OR_3,$$

phosphonous acid esters having the general formula $R_1-P(OR_2)-OR_3$, phosphinic acid esters having the general formula

$$R_1-P(R_2)-OR_3$$

and phosphinous acid esters having the general formula $R_1-P(R_2)-OR_3$, where R_1, R_2 and R_3 represent the same or different, unsubstituted or substituted hydrocarbon groups, the extractant being used in an amount such that the chlorides of Fe, Mo, V and Zn are simultaneously extracted, thereby producing a metal-bearing extractant and a raffinate, and separating the metal-bearing extractant from the raffinate;

B. treating the raffinate obtained in step (A) with H_2S, while keeping the pH of the raffinate below 2.5, thereby producing a precipitate of copper sulfide and a substantially decopperized raffinate and separating the decopperized raffinate from the copper sulfide;

C. adjusting the pH of the decopperized raffinate formed in (B) to between 2 and 6, thereby producing a precipitate of aluminum hydroxide and a dealuminized raffinate, and separating the aluminum hydroxide precipitate from the dealuminized raffinate;

D. treating the dealuminized raffinate formed in step (C) with H_2S, while keeping the pH of the raffinate between 3 and 6, thereby producing a precipitate consisting substantially of Co and Ni sulfides and a manganiferous raffinate, and separating the precipitate from the manganiferous raffinate; and

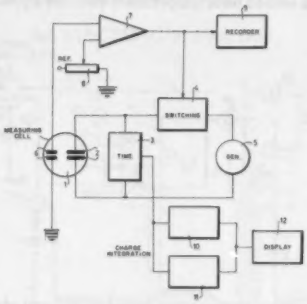
E. demanganizing the manganiferous raffinate obtained in (D).

4,026,774

COULOMETRIC MEASURING METHOD

Dénes Berky; Tamás Damokos; Jeno Havas, and Henrik Müller, all of Budapest, Hungary, assignors to Radelkis Elektrokemiai Muszergyarto Szovetkezet, Budapest, Hungary

Filed June 25, 1975, Ser. No. 590,133
Claims priority, application Hungary, July 2, 1974, RA 619
Int. Cl.² G01N 27/42
U.S. Cl. 204—1 T 7 Claims



1. A coulometric measuring method for the determination of the concentration and/or factor of acids and bases, comprising establishing a measuring cell, an indicator circuit, and a generator circuit, immersing in a supporting electrolyte in said measuring cell (1) four electrodes comprising a reference electrode (18) of said indicator circuit, a hydrogen ion activity-sensitive measuring electrode (16), an anode electrode (21), and cathode electrode (19); passing an electrical current through said anode electrode and said cathode electrode via said generator circuit, the generator circuit being equipped with a current generator (5) and the measuring circuit with a measuring amplifier (7) connected to a display unit (9) and its input being connected to the measuring electrode (16); and overcoming the adverse effect of the diffusion potential brought about by the diaphragm applied in apparatuses known up to now, by providing the reference electrode (18) as a diaphragmless electrode of the basic material silver, lead, mercury or thallium within the measuring cell in a space common with the measuring electrode (16), and by adding the chloride, bromide or iodide of potassium, sodium, rubidium, cesium, calcium, strontium or barium to the supporting electrolyte in the measuring cell both as a depolarizer and as a potential determining material.

4,026,775

ELECTROCOATING BATH TEMPERATURE CONTROL

Edward A. Russell, Bay Ridges, Canada; Richard L. Knipe, Orinda, and James E. Leaver, Alamo, both of Calif., assignors to Kaiser Aluminum & Chemical Corporation, Oakland, Calif.

Continuation of Ser. No. 448,780, March 6, 1974, abandoned.
This application Nov. 13, 1975, Ser. No. 631,758
Int. Cl.² C25D 13/00; F28D 7/00
U.S. Cl. 204—181 2 Claims

1. In the process of electrocoating resinous material onto a metal substrate wherein the temperature of the electrocoating bath containing said resinous material is maintained within the range from 90° F to about 135° F, the improvement in the process of controlling the temperature of the bath comprising

a. withdrawing electrocoating bath from a tank containing same;

b. sensing the temperature of the electrocoating bath;

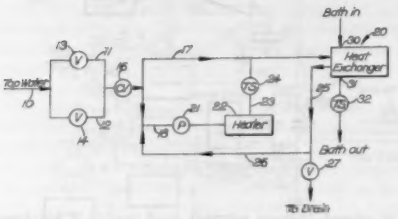
c. passing withdrawn bath through a heat exchange device in an indirect heat exchange relationship with heat ex-

change fluid flowing therethrough, with the temperature of the heat exchange fluid being controlled so that the temperature of the surfaces of the heat exchange device in contact with the electrocoating bath does not exceed 150° F;

d. supplying all of the heat exchange fluid from a single source thereof, wherein the temperature of the heat exchange fluid from said source is less than 90° F;

e. controlling the temperature of the bath at a level within the range from 90° F to about 135° F in the following manner:

i. if the sensed bath temperature exceeds a predetermined



maximum temperature between 90° and about 135° F, directing cool heat exchange fluid to the heat exchange device to reduce the temperature of the bath to at least the predetermined maximum temperature, with at least part of said cool heat exchange fluid coming directly from said source;

ii. if the sensed bath temperature is less than a predetermined minimum temperature between 90° and about 135° F, passing heat exchange fluid through a heating device to raise the temperature thereof and then directing the heated heat exchange fluid to the heat exchange device to raise the temperature of the bath to at least the predetermined minimum temperature.

4,026,776

METHOD FOR PRODUCING HIGH PURITY LEAD

Seishiro Hirakawa, and Ryoji Oniwa, both of Gifu, Japan, assignors to Mitsui Mining & Smelting Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 443,634, Feb. 19, 1974, abandoned. This application July 21, 1975, Ser. No. 597,714

Claims priority, application Japan, Dec. 20, 1970, 45-106560

Int. Cl.² C25C *1/16, 1/22*

U.S. Cl. 204—117 **2 Claims**

1. In a method for producing a high purity lead by the Betts process which comprises carrying out electrolysis in the presence of an electrolyte bath containing fluorosilicic acid and lead fluorosilicate, said process employing crude lead as the anode and high purity lead as the cathode, wherein lead is deposited on the cathode, the improvement which comprises separately treating a resulting slime filtrate and/or recovered electrolyte of the process by subjecting said filtrate and/or electrolyte to electrolysis in a cell having an anode of crude lead or an insoluble electrode and a cathode of refined lead or scrap anode to preferentially deposit bismuth on the cathode to remove bismuth therefrom and recycling the resulting filtrate and/or electrolyte for use in the process as the electrolyte for producing high purity lead.

4,026,777

METALLIC DESCALING SYSTEM

Donald R. Zaremski, Cheswick, Pa., and Albert Krepler, Vienna, Austria, assignors to Allegheny Ludlum Industries, Inc., Pittsburgh, Pa. and Ruthner Industrieanlagen Aktiengasellschaft, Vienna, Austria

Filed Apr. 1, 1976, Ser. No. 672,586

Int. Cl.² C25F *1/06, 1/02*

U.S. Cl. 204—141.5 **5 Claims**

1. A process for descaling a metallic body, which comprises the steps of: immersing said body in a bath of a molten oxidizing salt; maintaining said bath at a temperature above its melting point during said immersion, said immersion being for a period of at least 30 seconds; removing said body from said bath after scale on said body has been conditioned for subsequent removal; subsequently immersing said body in an electrolyte of an aqueous solution of at least one neutral salt from the group consisting of the chloride, sulfate and nitrate of an alkali metal or ammonium; passing an electric current through said body and electrolyte for a period of at least 4 seconds; and removing said body from said electrolyte.

4,026,778

PHOTOCHEMICAL ISOMERIZATION OF VITAMIN A COMPOUNDS

Michel Lalonde, Basel, and Hansjörg Stoller, Reinach, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

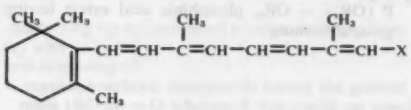
Filed Nov. 3, 1975, Ser. No. 628,280

Claims priority, application Switzerland, Nov. 12, 1974, 15087/74

Int. Cl.² B01J *1/10*

U.S. Cl. 204—159 **6 Claims**

1. The process for the photochemical isomerization of a compound of the formula:



wherein X is selected from the group consisting of —CHO, $-CH_2OH$, —COOH, $CH(R)_2$, $-CH_2OR_1$, $-COOR_2$, $-CONHR_3$ or $-CON(R_3)_2$ in which R is lower alkoxy or two R's taken together are lower alkylenedioxy, R_1 is alkanoyl or aroyl, R_2 is an alkyl, aryl or aralkyl group and R_3 is hydrogen, alkyl, aryl or aralkyl;

which process comprises irradiating a 9-cis isomer, an 11-cis isomer, a 9,11-di-cis isomer or mixtures thereof in either liquid form or in the form of at least 3% (wt./vol.) solutions with light having a wavelength range of about 240 nm to about 450 nm in the absence of sensitizers.

4,026,779

ELECTROLYTE FOR ELECTROCHEMICALLY MACHINING NICKEL BASE SUPERALLOYS

Richard Horace Shaw, Hampden, Mass., assignor to United Technologies Corporation, Hartford, Conn.

Filed May 6, 1976, Ser. No. 684,054

Int. Cl.² C25F *3/02*

U.S. Cl. 204—129.75 **3 Claims**

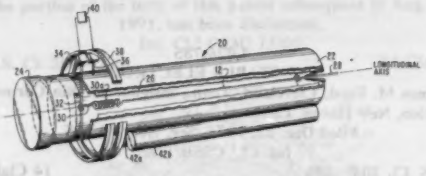
1. In electrochemically machining a part made of a nickel base superalloy having gamma and gamma prime phases present therein wherein the part is the anode and the tool is the cathode in an electrolytic cell, the improvement which comprises immersing the part in an aqueous solution of inorganic chloride and nitrate salts, including chloride ions in the amount of at least about 0.5 lbs/gal and nitrate ions in the amount of at least 1.0 lbs/gal, the solution providing essentially equal attack of the phases of said superalloy part when direct current is passed through the cell.

4,026,780

METHOD AND APPARATUS FOR CATAPHORETIC DEPOSITION

Robert Allen Gange, Belle Mead, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Apr. 5, 1976, Ser. No. 673,988
Int. Cl.² C25D 13/16, 17/00
U.S. Cl. 204—181 10 Claims



1. A method of cataphoretic deposition for obtaining coatings of insulating material which are substantially uniform in thickness on and around an elongated body, which comprises:

a. placing said body to be coated into a cylindrical tube with the major axis of said body being disposed along the longitudinal axis of said tube and maintained under tension in fixed relation to said tube, said body including at least a surface portion which is an electrical conductor, said tube including an electrically conductive body on and along its inner circumference, said tube having therein a suspension of the material to be deposited,

b. rotating said cylindrical tube about its longitudinal axis at a substantially constant rate with said tube being oriented such that the force of gravity acts orthogonally to the longitudinal axis of said tube, and then

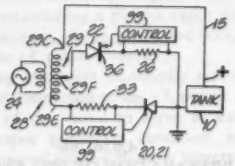
c. establishing an electric field between said conductive body on said inner circumference of said tube and said body to be coated while rotating said tube with said electric field being such that said body to be coated has a substantially constant surface charge density.

4,026,781

ANODIZING MEANS AND TECHNIQUES

Frederick S. Newman, Canoga Park; John R. Thorne, Hidden Hills, and John T. Hartman, Reseda, all of Calif., assignors to Scionics of California Inc., Culver City, Calif.

Continuation of Ser. No. 864,243, Aug. 7, 1969, abandoned, which is a division of Ser. No. 758,258, Sept. 9, 1968, Pat. No. 3,597,339. This application Mar. 28, 1972, Ser. No. 238,984
Int. Cl.² C25B 15/02
U.S. Cl. 204—228 10 Claims



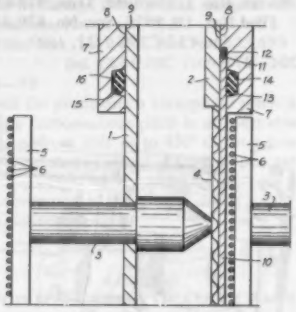
1. In an anodizing system wherein an anodizing tank contains an anodizing bath and there are electrode means in said bath for conducting an electrical current through said bath and wherein one of said electrodes is a part to be anodized by having its outer surface converted into an oxide with the oxygen for production of said oxide being supplied from said bath, the combination including a power supply connectable to said electrode means to produce a current flow through said bath for production of said oxide in said anodizing process, said power supply incorporating means alternately producing positive and negative current through said bath with the ratio of average negative current to average positive current being greater than approximately three percent but less than twenty percent.

4,026,782

ELECTROLYSIS CELL HAVING BIPOLAR ELEMENTS

Pierre Bouy, Enghien les-Baines; Hubert de Lachaux, Courbevoie, and Michel Conan, Rueil Malmaison, all of France, assignors to Rhone-Poulenc Industries, Paris, France

Filed July 29, 1975, Ser. No. 600,068
Claims priority, application France, July 29, 1974, 74.26233
Int. Cl.² C25B 1/16, 1/26, 7/00
U.S. Cl. 204—254 11 Claims



1. An electrolysis cell having bipolar elements arranged side by side, having at lest two peripheral frames surrounding at least one compartment of the electrolysis zone, and being equipped with a diaphragm, wherein the impermeable connection between two consecutive frames is ensured by intimate contact of their opposing peripheral surfaces which have, on their most external section, a non-deformable rigid face forming a plane of contact resting on the plane of contact of the adjacent frame, one of the opposite surfaces having at least one recess in which at least one elastic sealing member is arranged, and in that said diaphragm rests against the plane of contact of a frame opposite a recess in the adjacent frame and is kept in position by an elastically deformable sealing member arranged in the said recess of an adjacent frame.

4,026,783

ELECTROLYSIS CELL USING CATION EXCHANGE MEMBRANES OF IMPROVED PERMSELECTIVITY

Walther Gustav Grot, Chadds Ford, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 425,079, Dec. 17, 1973, Pat. No. 3,969,285. This application Apr. 27, 1976, Ser. No. 680,872
Int. Cl.² C25C 13/08, 9/00
U.S. Cl. 204—266 2 Claims

1. An electrolytic cell comprising a housing with anode and cathode sections, said sections separated by a film of fluorinated ion exchange polymer comprising

a. a first surface formed from an intermediate fluorinated polymer containing pendant sulfonyl halide groups attached to carbon atoms which have at least one fluorine atom connected thereto in which

i. at least 40% of the sulfonyl halide groups to a depth of at least one micron in the intermediate polymer have been reacted with a di- or poly-amine comprising at least two groups with one primary amine group and a second amino group either primary or secondary, said first surface facing the cathode section; and

ii. the polymer of (i) has been subjected to an elevated temperature of between 170° C. and the degradation

temperature of the reacted polymer for a period of time to increase permselectivity;

b. a second surface containing pendant sulfonyl groups attached to carbon atoms which have at least one fluorine atom connected thereto with at least a majority of the sulfonyl groups present as $-(SO_2NH)_mQ$, or $-(SO_3)_nMe$ wherein Q is selected from the group consisting of H, NH_4, cation of an alkali metal, cation of an alkaline earth metal and combinations thereof, m is the valence of Q, Me is a cation and n the valence of the cation.

4,026,784

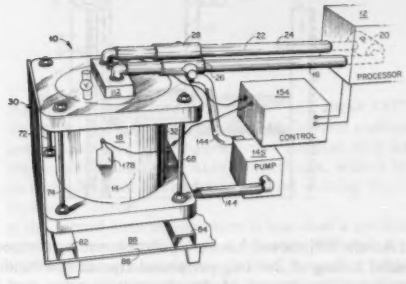
METAL RECOVERY UNIT

James R. Rivers, Rte. 1, Coalfield, Tenn. 37840

Filed Nov. 10, 1975, Ser. No. 630,442

Int. Cl.² C25C *1/22, 1/00*

U.S. Cl. 204—273 **8 Claims**



1. A metal recovery unit for recovering metal from metal-laden liquids by electrolysis comprising:

container means including a tubular cathode open at its opposite ends and defining an upright substantially cylindrical wall of said container means, cover means secured across and closing the top end of said cathode, said cover means defining liquid inlet means through which metal-laden liquid enters said container means and liquid outlet means through which metal-depleted liquid exits said container means, said cover further defining recirculating inlet passage means, said recirculating outlet passage means communicating with the interior of said container means and disposed with respect to said cylindrical wall to introduce liquid into said container means tangentially and angularly downwardly with respect to said cathode wall whereby liquid introduced into said container means through said recirculating inlet passage means flows substantially tangentially and downwardly of said cathode, and base means secured across and closing the bottom end of said cathode, said base means defining recirculating outlet passage means communicating with the interior of said container means, said recirculating outlet passage means extending in the direction of and tangentially with respect to the flow of said metal-laden liquid adjacent said base means for withdrawing liquid from said container means,

an elongated anode disposed concentrically within said cathode,

means for recirculating liquid within said container means, including conduit means connecting said recirculating inlet passage means in said cover means of said container means, with said recirculating outlet passage means of said base means, and pump means interposed in said conduit means along the length thereof,

control means developing a first current density at said cathode for electrolytically depositing metal from metal-laden liquid relatively rapidly onto said cathode for a predetermined period of time, and thereafter developing a second current density at said cathode.

4,026,785

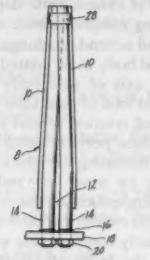
ADJUSTABLE ELECTRODE

James M. Ford, Cleveland, Tenn., assignor to Olin Corporation, New Haven, Conn.

Filed Dec. 22, 1975, Ser. No. 643,265

Int. Cl.² C25B *11/00*

U.S. Cl. 204—286 **14 Claims**



1. An electrode suitable for use in a cell for the electrolysis of alkali metal chloride solutions which comprises:

a. two electrode surfaces positioned vertically in parallel and having a space between said electrode surfaces, said electrode surfaces having an upper portion and a lower portion,

b. at least two electrode posts positioned in said space between said electrode surfaces, each of said electrode posts being rigidly attached to one of said electrode surfaces, and

c. removable clamping means contacting said upper portion of said electrode surfaces to contract said space between said upper portion of said electrode surfaces, said removable clamping means being positioned outside of said spacers between said electrode surfaces.

4,026,786

PREPARATION OF PBO_2 ANODE

Haruhisa Fukubayashi, and Waldemar M. Dressel, both of Rolla, Mo., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed July 31, 1975, Ser. No. 601,125

Int. Cl.² C25B *1/30, 11/10, 11/16*

U.S. Cl. 204—290 F **4 Claims**

1. In a method of operating an electrolytic cell for electrodeposition of lead dioxide on a titanium substrate in an electrolyte which includes lead nitrate and free nitric acid to produce an anode for use in the electrowinning metals from acid solutions, the improvement comprising maintaining free nitric acid in the electrolyte at a concentration in the range of about 100 to 110 grams per liter.

4,026,787

THIN FILM DEPOSITION APPARATUS USING SEGMENTED TARGET MEANS

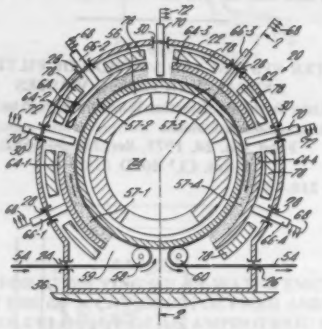
Manfred R. Kuehnle, Lexington, Mass., assignor to Coulter Information Systems, Inc., Bedford, Mass.

Continuation of Ser. No. 436,444, Jan. 25, 1974, Pat. No. 3,905,887, which is a division of Ser. No. 322,968, Jan. 12, 1973, Pat. No. 3,829,373. This application Sept. 12, 1975, Ser. No. 612,859

The portion of the term of this patent subsequent to Aug. 13, 1991, has been disclaimed.

Int. Cl.² C23C *15/00*

U.S. Cl. 204—298 **14 Claims**



1. Apparatus for coating a thin film upon a substrate of flexible plastic sheeting in a pressure vessel by means of sputtering which comprises:

A. a hermetically sealed pressure vessel,

B. rotary supply means mounted within the vessel for carrying a supply roll of a strip of flexible plastic sheeting within the pressure vessel,

C. rotary accumulating means mounted within the vessel for taking up the strip of flexible plastic sheeting in a roll after it has been coated,

D. a rotary drum mounted within the vessel and having its axis parallel with the axes of the rotary supply means and the rotary accumulating means, and there being structure disposed within the vessel and arranged to guide and transport the strip of flexible polyester sheeting from the rotary supply means, and engaged with only a portion of the circumference of the rotary drum and onto the rotary accumulating means so that a roll of polyester sheeting many times longer than the circumference of the drum may be coated without opening the vessel,

E. means for establishing a plasma vapor sputtering condition in the interior of the vessel and comprising

i. an exterior r.f. power source,

ii. a plurality of targets insulatedly mounted within the vessel and connected to the r.f. power source through the wall of the vessel to serve as cathodes for the plasma vapor sputtering condition, each target arranged grouped relative to other targets in a cylindrical pattern to define concave sputtering faces coaxial with the drum but radially spaced uniformly along the face outward from the drum and defining circumferentially spaced arcuate gaps between said concave sputtering faces of the target arrangements and the convex surface of the substrate when same is engaged upon the drum, plasma vapor cloud being generated within each said gap, the target arrangements being circumferentially spaced from one another and disposed relative to the drum opposite the portion of the circumference thereof which will be engaged by the strip of sheeting in passing over the drum so that when said clouds are generated they will occur between the targets sputtering faces and the strip,

iii. means for connecting the drum to the r.f. power source thereby to enable the drum to serve as the anode for the plasma vapor sputtering condition,

F. the target arrangements being disposed in an arc so that the vapor cloud segments within the gaps conform to the configuration of the gaps to form at least a portion of an arcuate belt whose curvature is generally coaxial with the drum and to provide only a radially inwardly directed particle flux component,

G. means for drawing a vacuum in said vessel and for admitting at least ionizing gas into the vessel, and

H. means for driving at least the accumulating means to pull the strip from the supply means and over said drum.

4,026,788

PROCESS FOR PRODUCING MESOPHASE PITCH

Edgar Ronald McHenry, Berea, Ohio, assignor to Union Carbide Corporation, New York, N.Y.

Filed Dec. 11, 1973, Ser. No. 423,693

Int. Cl.² C10C *1/00*

U.S. Cl. 208—39 **3 Claims**

1. A process for producing a mesophase pitch which comprises heating a carbonaceous pitch in an inert atmosphere at a temperature of from 350° C. to 450° C. for a time sufficient to produce a mesophase content of from 40 percent by weight to 90 percent by weight while passing an inert gas through the pitch during formation of the mesophase at a rate of at least 0.5 scfh. per pound of pitch.

4,026,789

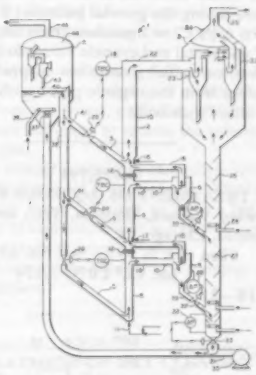
METHOD FOR CATALYTICALLY CRACKING HYDROCARBONS

John Preston James, Old Ocean, Tex., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 542,007, Jan. 17, 1975, Pat. No. 3,964,876. This application Feb. 13, 1976, Ser. No. 657,818

Int. Cl.² C10G *13/18, 37/02*

U.S. Cl. 208—74 **7 Claims**



1. A method for catalytically cracking hydrocarbons in a riser reactor comprising:

a. introducing a hydrocarbon material and steam into a first zone of a riser reactor having a plurality of zones;

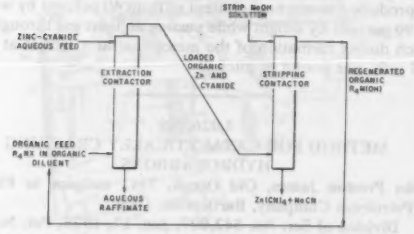
b. introducing fresh catalyst into said reactor first zone adjacent the point of introduction of said hydrocarbon and steam;

c. diverting at least a portion of the mixture of hydrocarbon, steam and catalyst from a downstream end of the reactor first zone into a separating means;

d. separating said catalyst from the mixture of same with hydrocarbon and steam;

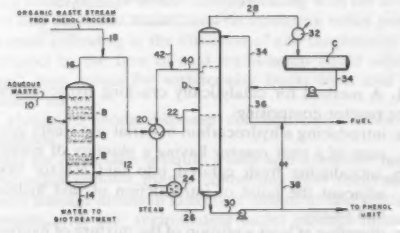
e. reintroducing the hydrocarbon and steam into said reactor into an upstream end of a second zone;
f. introducing fresh catalyst into said reactor adjacent the upstream end of the second zone to form a mixture of same with the hydrocarbon and steam from said separating means; and
g. separating said catalyst from said mixture of catalyst, hydrocarbon and steam from a downstream end of the reactor second zone and conducting said steam and hydrocarbon to equipment for processing same.

4,026,790
REMOVAL OF ZN OR CD AND CYANIDE FROM CYANIDE ELECTROPLATING WASTES
Fletcher L. Moore, Knoxville, Tenn., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.
Filed Mar. 7, 1975, Ser. No. 556,353
Int. Cl.² B01D *11/00*
U.S. Cl. 210—21 **4 Claims**



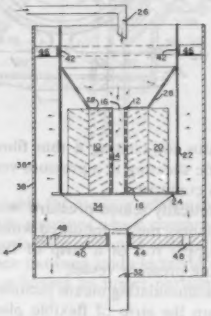
1. In a method for removing and recovering a metal selected from the group consisting of Zn or Cd and cyanide values from an alkaline cyanide solution in which said solution is contacted with an organic phase consisting essentially of a quaternary amine halide dissolved in an inert organic diluent, said amine halide having the general formula $(R_3CH_3)N$ Cl where R represents a)N Cl or branched chain alkyl group to effect transfer of said metal and cyanide values to the organic phase, the improvement which comprises stripping the metal and cyanide values from the organic phase with an aqueous solution of an alkali hydroxide.

4,026,791
TREATMENT OF AQUEOUS WASTE
James Edward Wallace, Houston, Tex., assignor to Pullman Incorporated, Chicago, Ill.
Filed Oct. 2, 1975, Ser. No. 618,877
Int. Cl.² C07C *37/24*
U.S. Cl. 210—21 **1 Claim**



1. In a process for producing phenol from cumene, an improved method for preparing a lean solvent for reducing the biological oxygen demand and phenol content of aqueous waste contaminated with organic materials from the process by liquid-liquid extraction, which comprises the steps of:
a. fractionating in a single column a mixture of a organic waste stream indigenous to the phenol process boiling between alpha-methyl styrene and acetone and the rich solvent stream from the extraction of said aqueous waste;
b. recovering (1) a side stream lean solvent cut which principally contains ethylbenzene and cumene substantially free of oxygen-containing organic compounds, (2) an overhead stream containing light organic materials and (3) a bottoms stream containing heavy organic materials including phenol; and
c. contacting said aqueous waste in an extraction system with said lean solvent cut from (1).

4,026,792
FILTER SYSTEM AND METHOD OF FILTERING ANIMAL PROCESSING WASTES
George Otto Orth, Jr., Seattle, Wash., assignor to Herbert L. Kalbfleisch, Sooke, Canada
Filed Jan. 24, 1975, Ser. No. 543,682
Int. Cl.² B01D *15/00*
U.S. Cl. 210—27 **2 Claims**

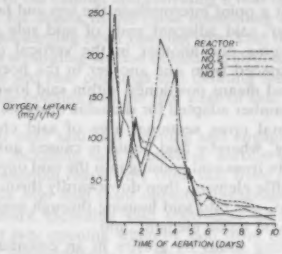


1. A method of treating waste water containing particulate matter, liquid oils and fats to remove the same, comprising:
passing the waste water stream through a hydrophilic fiber filter composed of a form-retaining cellulosic fiber mat having a density ranging from 0.2 to 15 lb. per cu. ft. for removal of the particulate matter contained in the aqueous waste water streams, and
immediately passing the water emerging from the hydrophilic fiber filter through a hydrophobic fiber filter composed of a form-retaining cellulosic fiber mat having a density ranging from 0.2 to 15 lb. per cu. ft. whose fibers are treated with a material rendering them oil adsorbent and substantially nonwettable by water, the hydrophobic fiber filter adsorbing the liquid oils and fats from the water stream passing therethrough.

4,026,793
AEROBIC SEWERAGE DIGESTION PROCESS (42 C. PROCESS)
David A. Rein, Star Rte. 1, Box 358B, Bremerton, Wash. 98310
Filed Aug. 21, 1975, Ser. No. 606,499
Int. Cl.² C02C *1/14*
U.S. Cl. 210—12 **6 Claims**

1. An aerobic digestion process for biologically reducing the solids content of an aqueous, biodegradable, organic sludge comprising waste activated sewage sludge, said process comprising the steps of:
a. introducing said sludge into a vessel under conditions sufficient to maintain the total volatile solids concentration in said vessel at less than about 2.5% by weight; and

b. maintaining the temperature of said sludge within the range of from about 38° C. to about 46° C. while introducing oxygen into said sludge in an amount effective to



promote the growth of Monadidae protozoa and to digest said sludge under aerobic conditions in the presence of Monadidae protozoa.

4,026,794

PROCESS FOR RESOLVING OIL-IN-WATER EMULSIONS BY THE USE OF A CATIONIC POLYMER AND THE WATER SOLUBLE SALT OF AN AMPHOTERIC METAL

Frank A. Mauceri, Clarendon Hills, Ill., assignor to Nalco Chemical Company, Oak Brook, Ill.

Filed Aug. 30, 1976, Ser. No. 719,014
Int. Cl.² B01D *17/04*
U.S. Cl. 210—43 8 Claims

1. A process for the removal of emulsified oils from waste water, said oily waste water containing from 1.0–100,000 ppm by weight of said oil, the removal being performed by the following steps:

A. Maintaining the pH of the waste water below 10.0;

B. Adding to the waste water with agitation from 2.0–20,000 ppm of an aqueous composition comprising:

1. 15–50% by weight of a water soluble salt of an amphoteric metal;
2. 1.0–15% by weight of a water soluble cationic terpolymer containing prior to polymerization:
   a. 5–40% by weight of diallyl dimethyl ammonium chloride;
   b. 5–70% by weight N-vinyl-2-pyrrolidone;
   c. 10–60% acrylamide, said terpolymer having a molecular weight of from 5,000 to 300,000;
3. 35–84% water, whereby, a floc containing said oil is formed; and then,

C. Recovering said floc.

4,026,795

METHOD FOR THE REGENERATION OF ACTIVATED CARBON

Hiroshige Okamoto, Sakai; Shiro Watanabe; Katsumi Yuasa, both of Kurashiki; Mitsuo Takano, Sakai; Itaru Fukinbara, and Nobumitsu Yano, both of Tokyo, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Nov. 6, 1975, Ser. No. 629,733
Claims priority, application Japan, Nov. 7, 1974, 49-128314
Int. Cl.² B01D *15/06*
U.S. Cl. 210—30 A 7 Claims

1. A method for the regeneration of activated carbon which comprises contacting an activated carbon having pollutants adsorbed therein with liquid dimethyl ether to desorb and separate the adsorbates from said activated carbon.

4,026,796

PROCESS FOR THE PURIFICATION OF INDUSTRIAL EFFLUENTS

Hans Wegmüller, Riehen, and Jaroslav Haase, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 582,021, May 29, 1975, Pat. No. 3,979,285, which is a continuation of Ser. No. 356,853, May 3, 1973, abandoned. This application May 27, 1976, Ser. No. 690,804
Claims priority, application Switzerland, May 10, 1972, 7012/72
Int. Cl.² C02B *1/60*; C02C *5/08*
U.S. Cl. 210—36 5 Claims

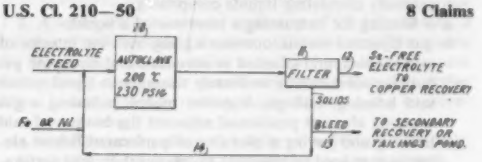
1. A process for purifying industrial effluents containing residual substances consisting of dyestuffs, optical brighteners, dyeing auxiliaries, detergents, tanning agents or mixtures thereof, which comprises bringing said effluents into contact with a cellulosic absorbent pretreated with a water soluble basic aminoplast which is a condensation product of formaldehyde, dicyandiamide and urea or of formaldehyde, decyandiamide and an alkylenepolyamine with 2 to 12 carbon atoms and 2 to 5 amino groups.

4,026,797

PRECIPITATION OF SELENIUM FROM COPPER ELECTROWINNING SOLUTIONS

Cvetko B. Nikolic, Golden, and John M. Laferty, Wheat Ridge, both of Colo., assignors to Amax Inc., Greenwich, Conn.

Filed Apr. 19, 1976, Ser. No. 678,047
Int. Cl.² C02C *5/02*
U.S. Cl. 210—50 8 Claims



1. A method for removing selenium from a copper-containing electrolyte solution containing over 2 ppm of total selenium which comprises,

adding to said copper-containing solution a substance selected from the group consisting of metals above copper in the electromotive series, excluding alkali metals, in an amount at least sufficient to reduce the selenium content to below 2 ppm,

subjecting said copper-containing electrolyte solution to an elevated temperature of at least about 190° C and a pressure of at least about 180 psig to reduce the total selenium content of said solution to less than 2 ppm by forming a selenium-containing precipitate,

and then separating the selenium-containing precipitate from said solution.

4,026,798

PERACID TREATMENT OF DRY CLEANING BATHS

Harry Marcus Castrantas, Newtown, Pa., and John T. Gresham, Skillman, N.J., assignors to FMC Corporation, Philadelphia, Pa.

Filed Nov. 28, 1975, Ser. No. 636,076
Int. Cl.² B01D *23/00*
U.S. Cl. 210—63 R 12 Claims

1. A process for treating a dirty dry cleaning bath containing a solvent, a detergent which does not react with peracids, and water to permit longer operation between distillations, which comprises: agitating said dirty bath in the absence of garments with a sufficient amount of an organic peracid which is readily soluble in the bath to provide about 0.001 to 0.15% active oxygen based on the weight of the bath, and about 0.05 to 12% of a water-soluble inorganic polyphosphate salt based on

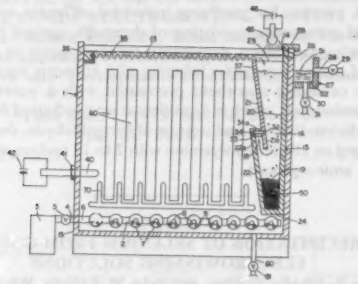
the weight of water present in the dry cleaning bath, at a pH value between about 5.0 and about 9.0; filtering the bath to remove suspended dirt and fine particles; and recovering a clean dry cleaning bath.

4,026,799

APPARATUS FOR REMOVING IMMISCIBLE SOLIDS AND LIQUIDS FROM A LIQUID

Edward C. Hildreth, 904 E. Main, Urbana, Ill. 61801

Filed Jan. 9, 1976, Ser. No. 647,874
Int. Cl.² B01D *23/00*
U.S. Cl. 210—84 **8 Claims**



1. A cleaning apparatus for removing particulate solids from autogenously circulating liquids comprising:
   a. a housing for containing a reservoir of a liquid;
   b. gas injection means, communicating with the interior of said housing, and adapted to introduce and distribute gas bubbles substantially uniformly throughout liquid within said housing, said gas injection means including a gas sparging element positioned adjacent the bottom of said housing and having a plurality of perforated lateral elements in spaced relationship to one another, said perforations in said lateral elements consisting of gas outlet orifices for gas injection into said housing; and
   c. baffle means forming
      1. a liquid circulation chamber having an inlet thereto and an outlet therefrom which open into the interior of said housing, said inlet and outlet being adapted to allow liquid to circulate from said housing into said chamber through said chamber, and from said chamber back into said housing,
      said inlet to said chamber being positioned at a greater height above the bottom of said housing than said outlet from said chamber.
      said outlet from said chamber being vertically baffled so as to be adpated not to allow gas bubbles formed and rising within liquid in said housing to enter said liquid circulation chamber through said outlet, whereby when gas bubbles are injected into liquid in said housing, liquid is caused autogenously to circulate from said housing and downwardly through said chamber, and
      said outlet from said chamber being positioned above the bottom of said chamber,
      2. within said liquid circulation chamber and positioned below said outlet from said circulation chamber, a zone, adapted to receive and collect particulate solids by gravity from liquid circulating through said chamber.

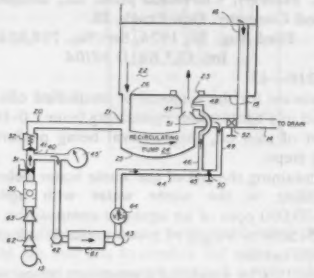
8. A method for treating a solids-containing a liquid within housing to effect removal of said solids from said liquid comprising
   1. injecting a gas into said liquid to form and distribute gas bubbles substantially uniform throughout said liquid,
   2. causing liquid in said housing to communicate with both openings of a baffle element comprising a chamber having side walls forming an enclosure having two openings in vertical spaced relationship to each other, the lower of said two spaced openings being defined by two separate sections of a side wall of said chamber having upper and lower ends respectively which terminate adjacent to each other at a point intermediate the top and bottom of said chamber, said adjacent ends of said side wall sections overlapping one another in the vertical direction and being spaced from one another in the horizontal direction, and means positioned within said lower opening in said chamber adapted for slideable movement to vary the horizontal cross sectional area of said chamber lower opening, whereby said liquid is caused autogenously to circulate from said housing into the said upper opening in said baffle element, then downwardly through said baffle element, and into said housing through said lower opening in said baffle element, and
   3. collecting solids by gravity in an essentially quiescent zone in said baffle element at a point below said lower opening of said baffle element.

4,026,800

DIALYSIS APPARATUS

Richard A. Friedrich, Brighton, and Robert L. MacNeill, Newburyport, both of Mass., assignors to National Medical Care, Inc., Boston, Mass.

Continuation-in-part of Ser. No. 462,411, April 19, 1974, abandoned. This application Sept. 30, 1974, Ser. No. 510,586
Int. Cl.² B01D *31/00*
U.S. Cl. 210—87 **12 Claims**



1. In a dialysis apparatus having a dialysate flow path comprising a first point and a second point, a dialysate recirculating pump in said path for circulating dialysate in said apparatus,
   the improvement comprising,
   a venturi means operatively interconnected with said pump and powered by said pump, with said venturi means being positioned at the first point in said flow path,
   said venturi means providing a negative pressure to cause desired flow of dialysate and reduced pressure in the dialysate at the second point in said flow path.

4,026,801

COMBINATION WATER SOFTENER CABINET AND BRINE RECEPTACLE

George G. Ward, Deerfield, Ill., assignor to Duratainer Inc., Windsor, Wis.

Filed Jan. 8, 1976, Ser. No. 647,613
Int. Cl.² C02B *1/42*
U.S. Cl. 210—140 **6 Claims**

1. A cabinet comprising a plastic molding and having a bottom wall and integral upstanding rear, side and front walls defining a substantial housing space a lower portion of which is adapted to serve as a brine receptacle, a rear area of said housing space being receptive of an upright water softener resin tank provided on its upper end with softener cycle controlling mechanism, and a front area within the housing space

being receptive of salt for the brine receptacle, the cabinet including:

top structure comprising upward extensions of said upstanding walls of the cabinet and providing a rear opening over said rear for access to the cycle controlling mechanism, and a salt-charging front opening over said front area;

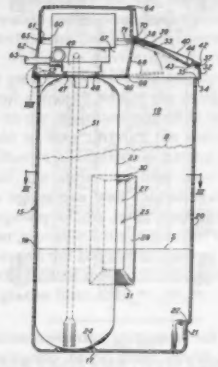
a transverse separating section of said top structure between said front and rear openings and defining the front edge of said rear opening and the rear edge of said front opening;

a rear cover over said rear opening and engaging said top structure including said transverse section adjacent to said top opening rearwardly from said front opening;

a front cover over said front opening engageable with said top structure including said transverse area forwardly from said rear opening whereby said front cover can be removed independently of said rear cover when it is desired to charge salt through said front opening into said brine tank;

a generally horizontal closure and baffle plate below said rear opening for closing said rear area over the softener resin tank and under the cycle control mechanism, said rear and front openings being smaller than said plate, and said plate being resiliently flexible so that it can be deflected for passing it through either of said openings;

said closure and baffle plate having an opening to receive



therethrough a part of the cycle control mechanism adjacent to the top of the tank;

edges of the plate engaging with said rear and side walls at a level substantially below said rear opening of said top structure;

a generally upwardly projecting baffle extension on the front edge of said plate engaging with said transverse separating section of said top structure between said front and rear openings whereby to define with said top structure and said rear cover a chamber within which said cycle controlling mechanism is substantially isolated and protected from fumes from said brine receptacle and also from salt during charging of salt through said salt charging opening into said brine receptacle;

an integral hinge connecting said baffle extension to said front edge of the plate and enabling swinging of the plate from a position generally planar with the plate to said generally upwardly projecting position;

latching means on the free end of said baffle extension and said transverse separating section cooperating for holding the baffle extension in its generally upward chamber closing and baffle position when swung up from said planar position;

and means for maintaining the resin tank in an upright position including respective inward retaining projections on said side walls intermediate said front and rear walls above said bottom wall for engaging and maintaining the resin tank in assembled position in said rear area adjacent to said rear wall.

4,026,802

WASTE WATER TREATMENT APPARATUS BY BIOLOGICAL ACTION

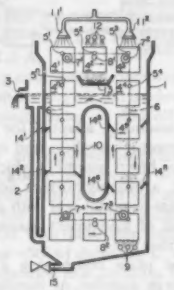
Kiyosi Akae, Kyoto, Japan, assignor to Unitika Ltd., Amagasaki, Japan

Filed Aug. 18, 1976, Ser. No. 715,583

Claims priority, application Japan, Aug. 20, 1975, 50-115562[U]; Oct. 30, 1975, 50-131181

Int. Cl.² C02C *1/04*

U.S. Cl. 210—151 **8 Claims**



1. A waste water treatment apparatus of the type having, a treatment tank including a water outlet and overflow means for determining the maximum water level in said tank, means for applying waste water to said tank, and biologically active filters in said tank for treating the waste water, the improvement comprising,

a. said filters comprising a plurality of individual filter beds,

b. a longitudinal partition centrally located in said tank,

c. means connected to said filters for holding said filters separate from one another, said means comprising an endless chain to which said filter beds are swingably attached, and means for rotating said plurality of filters in said tank around said partition, said endless chain being positioned relative to said tank that some of said filter beds are above said maximum water level of said tank at any time,

d. means for causing the water in said tank to circularize around said partition, said means comprising a bubble diffuser having an inlet port near the bottom of said tank on one side of said partition to inject bubbles into said tank on said one side, whereby the rise of said bubbles causes upward movement of said water on said one side and downward movement on the other side of said partition, and

e. means, positioned above said maximum water level of said tank, for washing said filter beds during a portion of the time they are rotating out of said water tank.

4,026,803

CHROMATOGRAPHIC COLUMN WITH IMPROVED END FITTINGS

Louis Abrahams, Worcester, and Manuel A. Russo, Framingham, both of Mass., assignors to Waters Associates, Milford, Mass.

Filed Dec. 24, 1975, Ser. No. 644,179

Int. Cl.² B01D *15/08*

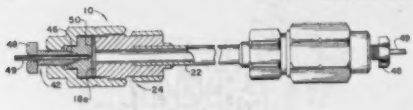
U.S. Cl. 210—198 C **4 Claims**

1. In a packed column adapted for use in liquid chromatography, said column comprising a tubular section, and end-fitting assemblies at the inlet and outlet of said tubular section and said end fittings at the inlet of said column comprise:

a. a first threaded connector member said first connector is permanently attached to an end of said tubing,

b. a second, complementary, threaded fitting member, adapted for attachment to said tubing and forming, with said first connector member, a chamber in which to house parts wetted by any said process liquid passing through said column,

c. said process-wetted parts forming a conduit between the end of said column and the adjacent end of said column, the improvement wherein said conduit comprises substantially no liquid dead space and said process-wetted parts are supported on said permanently attached connector and comprise, at least,



1. a filter insert assembly, adapted for compression between said connector members and comprising, at the end of said filter insert assembly which is most remote from said tube, a bearing surface adapted to receive and form a metal-to-metal seal with a liquid feed tube and, at the end of said insert assembly nearest said tube, a micro-filter

2. and a retainer plate comprising a central passage formed of a large number of minute holes and also having means to engage the internal wall of a said exterior connector member;

d. and wherein said filter insert assembly is readily removable from said housing without disturbing said packed column.

4,026,804

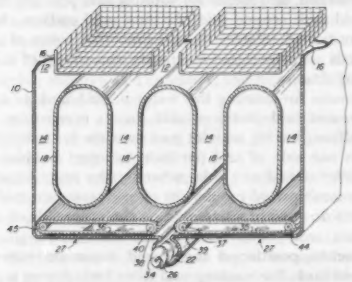
AUTO CRUMB REMOVER

Richard T. Keating, 715 S. 25th Ave., Bellwood, Ill. 60104

Filed Apr. 26, 1976, Ser. No. 680,081

Int. Cl.² A47J *37/12*; B01D *43/00*

U.S. Cl. 210—167 **4 Claims**



1. An apparatus for automatically removing crumbs and food particles from deep fat fryers comprising:

a. a fat-containing vessel having fat-heating tubes extending therethrough over a flat, horizontal bottom and said tubes being located below at least one wire basket;

b. a primary moving means mounting on said vessel having an input source of power and force and motion output;

c. a trough in the bottom of said vessel having a slot-like opening thereto in fluid communication with the fat-containing vessel and an outlet therefrom in the wall of said vessel;

d. a sweep means operationally-connected to the output of the primary moving means and mounted above and adjacent the bottom of said vessel for sweeping crumbs into said slot-like opening;

e. a conveyor means operationally-connected to the output of the primary moving means and mounted in said trough for conveying material therethrough to the outlet therefrom;

f. a conduit having its inlet in fluid communication with the outlet from the trough and its outlet outside of and at a level above the level of the fat in the fat-containing vessel; and

g. a receptacle having its inlet in fluid communication with the outlet from the conduit.

4,026,805

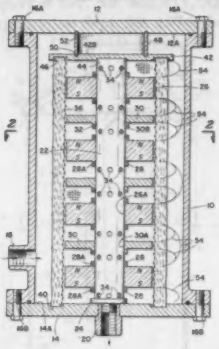
MAGNETIC FILTER

Leslie L. Fowler, Tulsa, Okla., assignor to Mapco, Inc., Tulsa, Okla.

Filed Mar. 18, 1976, Ser. No. 668,082

Int. Cl.² B01D *35/06*

U.S. Cl. 210—223 **5 Claims**



1. An apparatus for separating entrained solids and particularly paramagnetic filings, from liquid, comprising:

a vessel having a fluid inlet and a fluid outlet;

a center tube within the vessel communicating with said fluid outlet;

a plurality of magnetic discs, each having a central axial opening, the discs being received and supported in spaced relationship by said center tube;

a plurality of paramagnetic discs of diameter equal said magnetic discs, each paramagnetic disc having an axial opening therein and being received and supported by said center tube, one paramagnetic disc being positioned intermediate each adjacent pair of magnetic discs, the magnetic and paramagnetic discs being spaced apart of each other, said center tube having perforations therein intermediate said magnetic and paramagnetic discs for the flow of fluid therebetween into the perforations in said center tube;

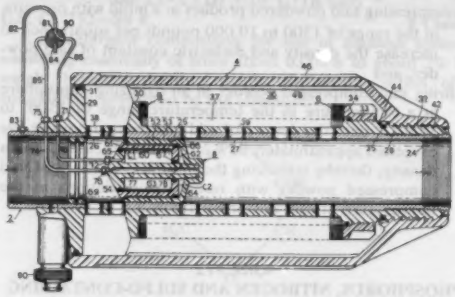
a filter tube of barrier filter media coaxial with said center tube and discs and encompassing said discs, the interior diameter of said filter tube being slightly greater than the diameter of said magnetic and paramagnetic discs; and

means of closing the top and bottom of said filter tube so that fluid flows only radially through said filter tube and into said center tube for discharge from said vessel, the magnetic lines of force between said magnetic discs and paramagnetic discs extending essentially radially through said filter tube whereby paramagnetic filings are trapped on the exterior surface of said filter tube and maintained in substantially radial orientation.

4,026,806
FILTER INCLUDING FLUID-FLOW CONTROL

Mordeki Drori, 89 Zahal Street, Kiron, Israel

Filed Apr. 20, 1976, Ser. No. 678,608
Claims priority, application Israel, Feb. 16, 1976, 49040
Int. Cl.² B01D *25/30*
U.S. Cl. 210—405 10 Claims



1. A fluid filtering device comprising: an inner member having an inner axial passageway for the fluid; an outer housing radially spaced from the inner member to define therewith an outer axial passageway for the fluid; said inner member being formed with a radial passageway providing a communicating path between the two axial passageways for the fluid; a filter disposed within the device upstream of the radial passageway in the path of the fluid flowing through said passageways; a deflector disposed within the axial passageway of the inner member on the upstream side of its radial passageway to deflect the fluid to flow through the radial passageway and through the filter; said deflector having a cylindrical wall disposed within the inner member and extending axially thereof, and a transverse wall extending transversely across the axial passageway of the inner member; and a fluid flow control member movable with respect to the cylindrical wall of the deflector and the radial passageway of the inner member to control the flow of the fluid through said radial passageway and through the filter.

4,026,807
ALKYNOXYMETHYL AMINES

Patrick M. Quinlan, St. Louis, Mo., and Richard D. McBride, Arlington, Tex., assignors to Petrolite Corporation, St. Louis, Mo.

Filed Aug. 9, 1974, Ser. No. 496,145
Int. Cl.² C07C *93/10*, *93/08*, *93/12*; C23F *11/00*
U.S. Cl. 260—584 C 5 Claims

1. A compound of the formula

$$RN(CH_2{-}OR')_2$$

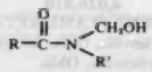
where R is a hydrocarbon group and R′ is an acetylenic moiety.

4,026,808
FLAME RETARDANT TEXTILE FINISHES

James J. Duffy, Buffalo, N.Y., assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Continuation-in-part of Ser. No. 239,785, March 30, 1972, abandoned. This application July 1, 1974, Ser. No. 485,038
Int. Cl.² C09D *5/18*, *1/00*; B27K *3/00*
U.S. Cl. 252—8.1 12 Claims

1. A flame retarding composition comprising tetrakis (hydroxymethyl) phosphonium chloride and a phosphorus containing N-hydroxymethyl amide in a mole ratio from about 1:1 to about 0.05:1, of the formula



wherein R is independently selected from substituted and unsubstituted amino and hydrocarbon substituents; R′ is independently selected from hydrogen and substituted and unsubstituted hydrocarbon substituents, providing at least one of R and R′ has a phosphorus substituent thereon.

4,026,809
LUBRICATING COMPOSITIONS CONTAINING METHACRYLATE ESTER GRAFT COPOLYMERS AS USEFUL VISCOSITY INDEX IMPROVERS

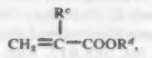
Donald R. Lachowicz, Fishkill, and Charles B. Holder, Wappingers Falls, both of N.Y., assignors to Texaco Inc., New York, N.Y.

Filed Dec. 19, 1974, Ser. No. 534,539
Int. Cl.² C10M *1/32*
U.S. Cl. 252—51.5 A 15 Claims

1. A lubricating composition comprising a major portion of a hydrocarbon lubricating oil and a minor portion sufficient to improve the viscosity index of said oil of a graft copolymer prepared by

A. contacting an ethylene/propylene/5-alkylidene-2-norbornene backbone terpolymer wherein the alkylidene group has from 1 to 16 carbon atoms and wherein the terpolymer has a molecular weight of about 4,000 to about 200,000, with dinitrogen tetroxide at a temperature of from about −30° to about 20° C, wherein the amount of dinitrogen tetroxide introduced is from about 0.00001 to about 0.01 mole/g of the terpolymer, to form a intermediate backbone terpolymer product having incorporated therein nitro and nitrite groups on the olefinic carbon atoms of the 5-alkylidene-2-norborene units of the said terpolymer, and

B. reacting said intermediate backbone terpolymer product at a temperature of from about 35° to about 175° C with an acrylate of the formula:

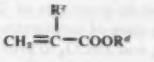


wherein R^c is hydrogen or alkyl of from 1 to 3 inclusive carbon atoms and R^d is alkyl of from 1 to 30 inclusive carbon atoms.

6. A lubricating composition comprising a major portion of a hydrocarbon lubricating oil and a minor portion sufficient to improve the viscosity index of said oil of a graft copolymer prepared by:

A. contacting an ethylene/propylene/5-alkylidene-2-norbornene backbone terpolymer, wherein the alkylidene group has from 1 to 16 carbon atoms and wherein the terpolymer has a molecular weight of about 4,000 to about 200,000 with a mixture of dinitrogen tetroxide and oxygen at a temperature of from about −30° to about 20° C to form an intermediate backbone polymer product having incorporated therein nitro and peroxy nitrate groups on the olefinic carbon atoms of the 5-alkylidene-2-norbornene units of the said terpolymer, wherein the mole ratio of dinitrogen tetroxide to oxygen in the said mixture is from about 1:1 to about 0.05:1 and wherein the amount of dinitrogen tetroxide introduced is from about 0.00001 to about 0.01 mole/g of the backbone polymer, and

B. reacting the said intermediate backbone polymer product at a temperature of from about 35° to about 175° C with an acrylate of the formula:



wherein R^c is selected from the group consisting of hydrogen and alkyl of from 1 to 3 inclusive carbon atoms and R^d is alkyl of from 1 to 30 inclusive carbon atoms.

4,026,810
INTUMESCENT FLAME RETARDANTS

Howard W. Bost, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Mar. 2, 1976, Ser. No. 663,006
Int. Cl.² C09K *3/28*
U.S. Cl. 252—8.1 **29 Claims**

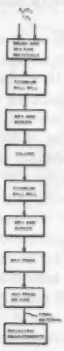
1. A method for improving the color of a cured intumescent flame retardant composition comprising (A) the initial condensation of a polyol having from 5 to 15 carbon atoms per molecule and from 4 to 8 hydroxyl groups per molecule in an approximate amount ranging from 5 to 40 parts with a phosphorus oxide compound of the formula $P_2O_5.xH_2O$ wherein x is a number in the range of 0 to 3 in an approximate amount ranging from 10 to 75 parts in the presence of 5 to 15 percent of an approximate amount ranging from 10 to 70 parts of a nitrogen compound selected from the group consisting of melamine, dicyandiamide, urea and dimethylurea, and a color improving amount of a color improving compound; (B) the addition to the mixture of step (A) of the balance of said nitrogen compound over a period of about 0.1–3 hours or more at a temperature of about 180°–300° C; and (C) thereafter curing by heating the reaction mixture of step (B) to evolve gaseous products, said color improving compound being of the formula $R–Y_z$ having from 1 to 25 carbon atoms per molecule, wherein Y is selected from the group consisting of —OH, —COOH and $—NR'_2$, z is a number having a value of 1, 2 and 3, R is an organic radical having a valence z selected from the group consisting of alkyl, cycloalkyl, alkoxy, aryl and combinations thereof, and R′ is selected from the group consisting of —H and —R, wherein one of said R′ groups can be joined with said R group to form a heterocyclic ring.

17. A cured intumescent flame retardant prepared according to the method of claim **1**.

4,026,811
MICROWAVE DIELECTRICS

Dennis W. Readey, Framingham; Edward A. Maguire, Jr., Ashland, and Albert E. Paladino, Needham, all of Mass., assignors to Raytheon Company, Lexington, Mass.

Continuation of Ser. No. 385,017, Aug. 2, 1973, abandoned, which is a continuation of Ser. No. 130,356, April 1, 1971, abandoned. This application Jan. 30, 1975, Ser. No. 545,462
Int. Cl.² H01B *3/00;* **C01G** *23/00*
U.S. Cl. 252—63.2 **1 Claim**



1. A method of forming a dielectric from titanium dioxide comprising the steps of:

mixing stoichiometric quantities of TiO_2 and a carbonate drawn from the class of carbonates consisting of $BaCO_3$, Li_2CO_3, $MgCO_3$ and $ZnCO_3$ to provide a mixture thereof;

milling said mixture in a ball mill containing a liquid medium to produce a liquid slurry;

drying said liquid slurry to produce a dried mixture;

granulating said dried mixture;

calcining said granulated mixture at a temperature within the temperature range of 800° to 1300° C to provide a chemical reaction between said stoichiometric quantities of TiO_2 and of the carbonate of said class of carbonates wherein there is formed a product drawn from the class of substances consisting of $BaTi_4O_9$, a mixture of Li_2TiO_3 and $Li_4Ti_5O_{12}$, $MgTi_2O_5$—TiO_2 and Zn_2TiO_4—TiO_2;

ball milling said product to produce a powder thereof;

compressing said powdered product in a mold with pressure in the range of 1500 to 10,000 pounds per square inch to increase the density and dielectric constant of said powder; and

firing said compressed powder in an oxidizing atmosphere at a temperature in the temperature range of 1100° to 1450° C until the density of said compressed powder has exceeded approximately 85% of the theoretical maximum density, thereby stabilizing the dielectric constant of said compressed powder with respect to variations in the temperature of said compressed powder.

4,026,812
PHOSPHORUS, NITROGEN AND SULFO-CONTAINING ADDITIVES

William Monroe LeSuer, Cleveland, Ohio, assignor to The Lubrizol Corporation, Cleveland, Ohio

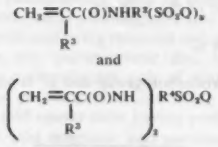
Division of Ser. No. 424,246, Dec. 12, 1973, Pat. No. 3,926,821. This application Nov. 24, 1975, Ser. No. 634,390
Int. Cl.² C09K *50/00;* **C10M** *1/44, 1/48, 1/40*
U.S. Cl. 252—75 **26 Claims**

1. A hydraulic fluid comprising an oil-in-water emulsion of 1 to 80 parts water, about 20 to about 99 parts oil and about 0.1 to about 20 parts of at least one sulfur-, nitrogen- and phosphorus-containing additive made by reacting one or more phorphorus acid compounds of the formula

(A)

wherein each X is independently oxygen or divalent sulfur, M is a hydrogen, an equivalent of a metal or ammonium cation, R is hydrogen or a hydrocarbyl, hydrocarbyloxy, or hydrocarbyl mercapto group of about one to about thirty carbon atoms, and R′ is XM or R, with the proviso that the total number of carbon atoms in both R and R′ is at least two, with

B. one or more sulfo- and nitrogen-containing compounds of the general formulae



and

wherein y is one or two, each R^3 is independently hydrogen or lower alkyl group of one to seven carbon atoms, R^2 is di- or trivalent hydrocarbyl group having one to eighteen carbon atoms, R^4 is a trivalent hydrocarbyl group having one to eighteen carbon atoms, and Q is selected from the group consisting of —OH, $—OR^3$, —OM, —-O(Alkylene-O)$_n$-R^3, -N(R^3)$_2$, -NR^3(Alkylene-NR^3)$_n$$R^3$, -OH($R^3$)$_4$, and -$O^-N^+R_3^3$-(Alkylene-$NR^3$)$_n$$R^3$, wherein n has an average value of about one to about ten, M is as defined in (A) and the alkylene group has from one to ten carbon atoms.

4,026,813
MONOALKYL-PARA-DIOXANES

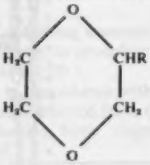
Vincent Lamberti, Upper Saddle River, and Eddie N. Gutierrez, Fort Lee, both of N.J., assignors to Lever Brothers Company, New York, N.Y.

Division of Ser. No. 452,222, March 18, 1974, abandoned. This application Apr. 8, 1975, Ser. No. 566,581

Int. Cl.[2] C11D *3/50*; C11B *9/00*

U.S. Cl. 252—89 R 5 Claims

1. A detergent composition for use in aqueous systems consisting essentially of from about 0.001% to about 2% by weight, based on the total weight of the composition, of a compound represented by the structure:



wherein R is a straight-chain hydrocarbon radical selected from the group consisting of pentyl, heptyl, nonyl, decyl, hendecyl, dodecyl, tridecyl, tetradecyl, pentadecyl, hexadecyl, heptadecyl, octadecyl, nonadecyl, eicosyl, heneicosyl, and docosyl radicals and mixtures thereof; and an anionic, cationic, nonionic, or amphoteric surfactant compound.

4,026,814
OXIDO-REDUCTASE IN SOAP

George Arthur Johnson, Wirral; Martin Rodney Ewart, Chester, and Brian Anthony Pethica, Altrincham, all of United Kingdom, assignors to Lever Brothers Company, New York, N.Y.

Filed Aug. 25, 1975, Ser. No. 607,166

Claims priority, application United Kingdom, Sept. 9, 1974, 39031/74

Int. Cl.[2] C11D *9/22*, *9/40*

U.S. Cl. 252—132 10 Claims

1. A soap of a fatty acid comprising

a. an oxido-reductases enzyme in an amount effective to inhibit the generation of malodors during storage of the soap;

b. a hydrogen acceptor selected from the group consisting of nicotinamide-adenine-dinucleotide, nicotinamide-adenine-dinucleotide phosphate and mixtures thereof.

4,026,815
METHOD FOR PREVENTING CORROSION IN WATER-CARRYING SYSTEMS

Herbert Kallfass; Christian Rasp, and Reinhard Schliebs, all of Cologne, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

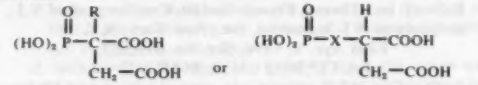
Filed June 20, 1974, Ser. No. 481,430

Claims priority, application Germany, June 30, 1973, 2333353

Int. Cl.[2] C02B *5/06*; C23F *11/10*

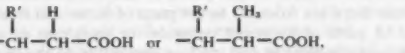
U.S. Cl. 252—180 8 Claims

1. In the inhibition of corrosion and scale formation in a water-carrying system wherein to the water there is added about 5 to 100 g/m³ of a phosphonocarboxylic acid of the formula



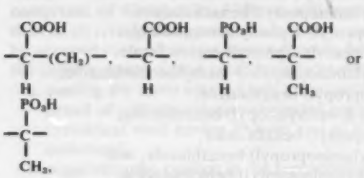
in which

R is hydrogen, an alkyl, alkenyl or alkinyl radical having up to 4 carbon atoms, a phenyl, cycloalkyl or phenylalkyl radical, or the radical



R′ is hydrogen, an alkyl radical having up to 4 carbon atoms or a carboxyl radical; and

X is

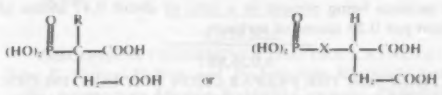


the improvement which consists essentially of further adding to the water about 0.05 to 100 ppm, constituting about 5 to 500% by weight of the phosphonocarboxylic acid, of at least one member selected from the group consisting of a benzimidazole derivative selected from the group consisting of

Δ ²-2-(ε-aminopentyl)-imidazoline,
Δ ²-1-(β-aminoethyl)-2-(ε-aminopentyl)-imidazoline,
Δ ²-2-(ε-aminopentyl)-thiazoline,
2-(β-amino-β-methylpropyl)-benzimidazole,
2-(δ-aminobutyl)-benzimidazole,
2-(ε-aminopentyl)-benzimidazole,
2-(λ-aminoundecyl)-benzimidazole,
2-(ε-methylaminopentyl)-benzimidazole,
2-(ε-aminopentyl)-1-phenylbenzimidazole,
2-(ε-aminopentyl)-5-methylbenzimidazole,
2-(γ-phenylaminopropyl)-5-methylbenzimidazole,
2-(γ-aminopropyl)-benzthiazole,
2-(β-amino-β-methylpropyl)-benzthiazole,
2-(ε-aminopentyl)-benzthiazole,
2-(γ-methylaminopropyl)-benzthiazole, and
2-(ε-dimethylaminopentyl)-benzimidazole,

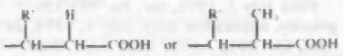
polyacrylamide with a molecular weight of about 30,000 to 2,000,000, polyethyleneimine with a molecular weight of about 100,000 to 1,000,000, polyvinylpyrrolidone with a molecular weight of about 20,000 to 800,000, and lignin sulfonate.

5. A corrosion inhibitory composition consisting essentially of a phosphonocarboxylic acid of the formula



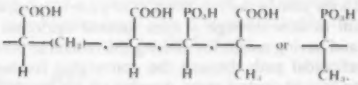
in which

R is hydrogen, an alkyl, alkenyl or alkinyl radical having up to 4 carbon atoms, a phenyl, cycloalkyl or phenylalkyl radical, or the radical



R′ is hydrogen, an alkyl radical having up to 4 carbon atoms or a carboxyl radical; and

X is



and about 0.05 to 100 ppm, constituting about 5 to 500% by weight of the phosphonocarboxylic acid, of at least one member selected from the group consisting oa a benzimidazole derivative selected from the group consisting of

Δ²-2-(ε-aminopentyl)-imidazoline,
Δ²-1-(β-aminoethyl)-2-(ε-aminopentyl)-imidazoline,
Δ²-2-(ε-aminopentyl)-thiazoline,
2-(β-amino-β-methylpropyl)-benzimidazole,

2-(δ-aminobutyl)-benzimidazole,
2-(ε-aminopentyl)-benzimidazole,
2-(λ-aminoundecyl)-benzimidazole,
2-(ε-methylaminopentyl)-benzimidazole,
2-(ε-aminopentyl)-1-phenylbenzimidazole,
2-(ε-aminopentyl)-1-phenylbenzimidazole,
2-(γ-phenylaminopropyl)-5-methylbenzimidazole,
2-(γ-aminopropyl)-benzthiazole,
2-(β-amino-β-methylpropyl)-benzthiazole,
2-(ε-aminopentyl)-benzthiazole,
2-(γ-methylaminopropyl)-benzthiazole, and
2-(ε-dimethylaminopentyl)-benzimidazole,

polyacrylamide with a molecular weight of about 30,000 to 2,000,000, polyethyleneimine with a molecular weight of about 100,000 to 1,000,000 polyvinylpyrrolidone with a molecular weight of about 20,000 to 800,000, and lignin sulfonate.

4,026,816
CERIUM AND TERBIUM ACTIVATED ALUMINATE PHOSPHORS

Peter Whitten Ranby, and Doreen Yvonne Hobbs, both of London, England, assignors to Thorn Electrical Industries Limited, London, England

Filed Jan. 17, 1975, Ser. No. 540,804
Claims priority, application United Kingdom, Jan. 17, 1974, 2279/74
Int. Cl.² C09K *11/46*
U.S. Cl. 252—301.6 R **7 Claims**

1. A luminescent material having the following formula:

$$(Ce, Tb)_z A_x Al_{22} O_z$$

wherein z is the combined total amount of cerium and terbium and has a value of about 1; A is selected from Mg, Zn, Li_2 and mixtures thereof; y has a value of from about 0.9–2.2; and x is the number of atoms of oxygen required to satisfy the valencies of the constituent metals, calculated on the basis of trivalent Ce, Tb and Al, divalent Mg and Zn, and monovalent Li; said material having a hexagonal or "B-alumina" crystal structure, and having an ultimate particle size as prepared and without harmful milling, of about 3 to 30 microns, said cerium and terbium being present in a ratio of about 0.47 atoms of cerium per 0.53 atoms of terbium.

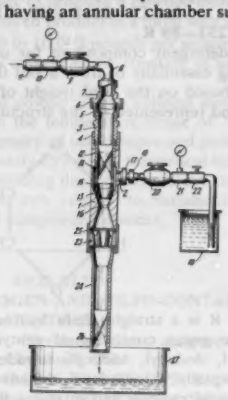
4,026,817
METHOD FOR THE PREPARATION IN A CONTINUOUS WAY OF WATER/OIL EMULSIONS AND APPARATUS SUITABLE THEREFOR

Brunello Ciuti, San Donato Milanese; Ferdinando Angelini, Milan, and Ernesto Brandolese, Grafignana, all of Italy, assignors to Snam Progetti S.p.A., Milan, Italy

Filed July 3, 1975, Ser. No. 592,730
Claims priority, application Italy, July 4, 1974, 24788/74
Int. Cl.² B01J *13/00;* **B01F** *3/08, 5/04*
U.S. Cl. 252—312 **4 Claims**

1. The method of preparing an oil and water emulsion as a continuous process which comprises, feeding a stream of water to a duct containing a Venturi providing a converging frustum of a cone zone, a diverging frustum of a cone zone and a central zone joining the two frustum of a cone zones, causing the stream to flow through a zone located upstream of the Venturi and having means for causing the stream to flow along a first helicoidal path through the converging frustum of a cone zone to said central zone, drawing oil for emulsification to the duct at a point adjacent said zone upstream of the Venturi and causing said oil to flow along a helicoidal path in the same direction as said first helicoidal path so that the oil and water mix and emulsify in said central zone, causing the emulsion so formed to flow through the diverging frustum of a cone zone, then causing said emulsion to flow along a second helicoidal path whose slope is the reverse of the slope of the first helicoidal path, and thereafter discharging the emulsion from said duct.

3. Apparatus for the preparation of a water and oil emulsion as a continuous process comprising, a duct containing a Venturi providing a converging frustum of a cone surface, a diverging frustum of a cone surface and a throat, a tube mounted for adjustable sliding movement in said duct upstream of the Venturi, a frustum of a cone nozzle mounted on the downsteam end of the tube to direct a stream of water into said throat and having an external surface parallel to said converging frustum of a cone surface and provided with involuted grooves, said duct having an annular chamber surrounding the lower portion of said tube and communicating with said grooves and with said throat, an oil supply pipe communicating with said chamber, a helicoidally wound strip mounted in said tube with its axis parallel to the tube axis, adapted to direct the water to flow from the nozzle along a first helicoidal path, and means located in the tube downstream of the Venturi adapted to direct the emulsion to flow along a second helicoidal path whose slope is opposite to the direction of slope of the first helicoidal path.



4,026,818
TRANSPARENT RINGING GELS

Joseph P. Claudelli, Ramsey, N.J., assignor to Van Dyk & Company, Incorporated, Belleville, N.J.

Filed Dec. 19, 1975, Ser. No. 642,558
Int. Cl.² B01J *13/00*
U.S. Cl. 252—316 **3 Claims**

1. An aqueous, transparent ringing gel comprising

Component	Ranges (% by Weight)
(2-ethyl-1,3-dihydroxy) 2-propyl Oleamide	5 – 9
Kritchevsky Base from the condensation of one mole of a higher carboxylic acid with two moles of diethanolamine	6 – 8
Isostearic Acid	1 – 3.5
2-ethyl-1,3-hexanediol	.5 – 2.5
Water	60 – 70
Mineral Oil	12 – 16.

4,026,819
PRODUCTION OF HYDROUS PENTAVALENT ANTIMONY OXIDE SOL COMPOSITION, DRY POWDER PREPARED THEREFROM, AND PRODUCTION OF SAID DRY POWDER

Ronald Francis Langere, Cranbury; Otto Ernest Loeffler, Rahway, and Thomas Francis Santini, Cranbury, all of N.J., assignors to N L Industries, Inc., New York, N.Y.

Filed Apr. 9, 1976, Ser. No. 675,557
Int. Cl.² B01J *13/00;* **B01F** *3/12*
U.S. Cl. 252—313 R **4 Claims**

1. A process for producing a stable aqueous antimony pentoxide sol comprising from 10% to 50% antimony pentoxide and the remainder water, said sol prepared by admixing antimony trioxide, hydrogen peroxide and water in amounts such that there are from 0.7 to 9.4 parts of water and from 0.65 to 0.68 parts of hydrogen peroxide for each part of antimony trioxide present in said mixture and refluxing the mixture for

a period of 1 to 10 hours then cooling the mixture, thus forming the stable antimony pentoxide sol, all of the percentages and parts expressed on a weight basis.

4,026,820
SOLID CATALYSTS FOR OXIDATIVE DEHYDROGENATION OF ALKENES OR ALKADIENES TO FURAN COMPOUNDS

Floyd E. Farha, Jr.; Marvin M. Johnson, and Donald C. Tabler, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 389,738, Aug. 16, 1973, Pat. No. 3,928,389. This application Sept. 29, 1975, Ser. No. 617,894
Int. Cl.² B01J *21/02, 27/14*
U.S. Cl. 252—432 **17 Claims**

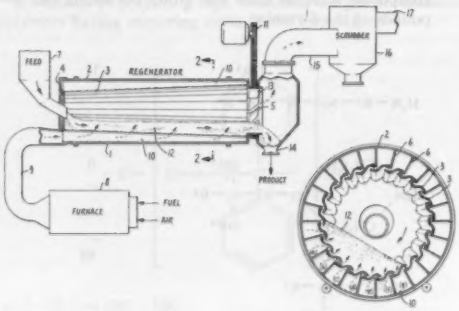
1. A composition consisting essentially of phosphorus, iron and oxygen, with the iron-to-phosphorus atom ratio being in the range of 2:1 to about 20:1.

5. A composition in accordance with claim 4 wherein said solid catalyst support is selected from the group consisting of zinc oxide, silica, alumina, boria, magnesia, titania, zirconia, and mixtures thereof.

4,026,821
CATALYST REGENERATION

Richard J. Schoofs, Moraga, Calif.; Lloyd J. Nordhausen, and Lee A. Dugdale, both of Grand Junction, Colombia, assignors to Calco Venture, Moraga, Calif.

Filed May 10, 1976, Ser. No. 684,559
Int. Cl.² B01J *23/94, 23/92, 23/96*
U.S. Cl. 252—419 **2 Claims**



1. The method of regenerating hydrotreating catalysts, comprised of Group VIb, VIIb or VIII metals or mixtures thereof on a rugged support, which have become deactivated during use by an accumulation of carbonaceous deposits on the catalyst surfaces which comprises:

a. passing the spent catalyst into a regeneration zone comprised of a slowly rotating elongated generally horizontal cylindrical shell having its inlet end at a level above its outlet end,

b. supporting the catalyst in the regeneration zone on overlapping louvers which extend the length of the cylindrical shell and are affixed to the interior of the cylindrical shell,

c. introducing hot gas having an oxygen content in the range about 14 to 21 percent by volume into the space at the bottom of the shell between the louvers and the shell so that it passes between the louvers and through the catalyst supported on the louvers,

d. withdrawing both gas and catalyst from the space enclosed by the louvers, the catalyst being withdrawn at a rate adapted to maintain an average catalyst residence time of at least one hour in the regeneration zone,

e. maintaining the rate of hot gas introduction at a level such that from 15 to 75 pounds per hour of hot gas are introduced into the regeneration zone for each pound of catalyst contained in the regeneration zone, and

f. adjusting the temperature of the hot gas introduced into the regeneration zone so as to maintain a temperature in the range 600° to 900° F. in the gas withdrawn from the regeneration zone.

2. The method of regenerating hydrotreating catalysts, comprised of Groub VIb, VIIb or VIII metals or mixtures thereof on a rugged support, which have become deactivated by accumulation of carbonaceous deposits having a substantial sulfur content on the catalyst surfaces which comprises:

a. passing the spent catalyst into a regeneration zone comprised of a slowly rotating elongated generally horizontal cylindrical shell having its inlet end at a level about its outlet end,

b. supporting the catalyst in the regeneration zone on overlapping louvers which extend the length of the cylindrical shell and are affixed to the interior of the cylindrical shell,

c. introducing hot gas having an oxygen content in the range about 14 to 21 percent by volume into the space at the bottom of the shell between the louvers and the shell so that it passes between the louvers and through the catalyst supported on the louvers,

d. withdrawing both gas and catalyst from the space enclosed by the louvers, the catalyst being withdrawn at a rate adapted to maintain average catalyst residence time of at least 1 hour in the regeneration zone,

e. maintaining the rate of hot gas introduction at a level such that from 15 to 75 pounds per hour of hot gas are introduced into the regeneration zone for each pound of catalyst contained in the regeneration zone,

f. adjusting the temperature of the hot gas introduced into the regeneration zone so as to maintain a temperature in the range about 400° to 700° F. in the gas withdrawn from the regeneration zone, whereby essentially all of the sulfur and a portion of the carbon is removed from the catalyst surfaces,

g. returning the catalyst withdrawn from the regeneration zone to the regeneration zone and subjecting it to steps (a) to (f), inclusive, with the provisos that the temperature of the hot gas introduced in repeated step (f) is adjusted so as to maintain a temperature in the range 700° to 900° F. in the gas withdrawn from the regeneration zone and that the residence time of the catalyst in the regeneration zone during this step is in the range 1 to 6 hours.

4,026,822
ZIRCONIUM PHOSPHINE COMPLEX CATALYST

John F. Motier, Dolton, and Jin Sun Yoo, Riverdale, both of Ill., assignors to Atlantic Richfield Company, Philadelphia, Pa.

Division of Ser. No. 820,302, April 29, 1969, Pat. No. 3,855,341. This application July 12, 1974, Ser. No. 488,134
Int. Cl.² B01J *31/02*
U.S. Cl. 252—429 B **9 Claims**

1. A catalyst comprising a complex of

A. zirconium acetylacetonate;

B. an electron donor ligand phosphine of the formula R_3P wherein each R is a hydrocarbon of up 20 carbon atoms, with

C. a combination of a reducing agent capable of reducing zirconium acetylacetonate to an oxidation state of less than 4 and a non-protonic Lewis acid capable of forming a coordination bond with zirconium selected from a compound represented by the formula

$$R'_{n-y}MX_y$$

wherein

R′ is alkyl of 2 to about 6 carbon atoms, X is chlorine, M is a metallic element of coordination number n′ whose halides are Lewis acids selected from aluminum magnesium, beryllium, lead, zinc and tin and y is a number having a value of greater than 0:

the molar ratio of (B) to (A) being about 2 to 7:1 and the molar ratio of (C) to (A) being about 10 to 20:1, said components (C) and (A) being combined to reduce zirconium represented by (A) to an oxidation state of less than 4, and form a coordination bond with (A).

4,026,823
HYDROCARBON REFORMING CATALYST AND METHOD FOR PREPARING SAME

James P. Van Hook, Basking Ridge, and Joseph C. Yarze, Union, both of N.J., assignors to Pullman Incorporated, Chicago, Ill.

Division of Ser. No. 120,971, May 4, 1971, abandoned. This application Mar. 31, 1975, Ser. No. 564,008

Int. Cl.² B01J *21/06, 23/74*

U.S. Cl. 252—472 **24 Claims**

1. The process for preparing a reforming catalyst composition which comprises:

treating a zirconia support with a cobalt component and a nickel component as the active components, said active components consisting essentially of a solution or suspension of the metal oxide, the elemental metal, the metal salt, a nickel cobaltide or mixtures thereof;

drying the treated mass of temperatures between about 175° F. and about 550° F. to form an intermixture; and

heating said intermixture to a temperature between about 600° F. and 3000° F. to form a ternary catalyst containing between about 0.2 and about 30 weight percent cobalt and between about 0.1 and about 30 weight percent nickel, based on the corresponding oxides, and having a weight ratio of nickel to cobalt between about 1:15 and about 9:1, and at least 1.0 weight percent concentration of the combined cobalt and nickel components in the catalyst composition.

4,026,824
2,6,6-TRIMETHYL-1-CYCLOHEXEN-1-YLACETALDEHYDE FRAGRANCE COMPOSITION

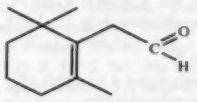
Alan Owen Pittet, Atlantic Highlands; Erigh Manfred Klaiber, Neptune; Manfred Hugo Vock, Locust, all of N.J.; Edward J. Shuster, Brooklyn, N.Y., and Joaquin Vinals, Red Bank, N.J., assignors to International Flavors & Fragrances Inc., Union Beach, N.J.

Continuation-in-part of Ser. No. 507,412, Sept. 19, 1974, Pat. No. 3,940,499. This application July 24, 1975, Ser. No. 598,805

Int. Cl.² C11B *9/00*

U.S. Cl. 252—522 **2 Claims**

1. A fragrance modifying composition consisting essentially of from 0.05% up to 10% by weight of said composition of 2,6,6-trimethyl-1-cyclohexen-1-ylacetaldehyde having the structure:



and the remainder of said fragrance modifying composition being at least one auxiliary perfume ingredient organoleptically compatible with and non-reactive with said 2,6,6-trimethyl-1-cyclohexen-1-ylacetaldehyde.

4,026,825
FOAMING AND CONDITIONING DETERGENT COMPOSITION

Howard Robertson Steen, and Henry Trainor, both of Newcastle upon Tyne, England, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed June 11, 1975, Ser. No. 585,936

Claims priority, application United Kingdom, June 14, 1974, 26475/74

Int. Cl.² C11D *1/00, 3/32, 17/02*

U.S. Cl. 252—547 **14 Claims**

1. A foaming and conditioning composition providing suds and a layer of emollient oil upon addition to water consisting essentially of a mutually, insoluble mixture of a water-soluble foaming organic detergent and a water-insoluble oily material having skin-softening or emollient properties, neither the detergent nor the oily material being soluble in the other in an amount greater than about 0.1% by weight of the solvent material, the composition being substantially anhydrous, the viscosity of the composition being less than 500 centipoises, and the organic detergent being present at a level of from about 10 to about 60% by weight of the composition, being in the form of finely divided particles containing at least 50% by weight of an organic surfactant selected from the group consisting of anionic, nonionic, cationic, zwitterionic and amphoteric surfactants, and having a moisture content of less than 5% by weight, at least 90% of said particles being of a size to pass a 100 mesh screen and at least 50% of said particles being of a size to pass a 200 mesh screen, and said particles having a bulk density of at least 0.4.

4,026,826
CURABLE RESIN COMPOSITION FOR FORMING ANTI-FOGGING ABRASION-RESISTANT COATING

Masaru Yoshida, and Isao Kaetsu, both of Takasaki, Japan, assignors to Japan Atomic Energy Research Institute, Tokyo, Japan

Filed Oct. 6, 1975, Ser. No. 620,540

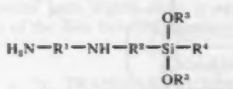
Claims priority, application Japan, Oct. 9, 1974, 49-115638

Int. Cl.² C08F *299/08*

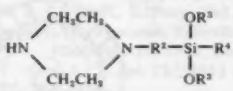
U.S. Cl. 260—2 S **10 Claims**

1. A curable resin composition for forming anti-fogging abrasion-resistant coating essentially consisting of:

20 – 90 parts by weight of the hydrolysate of at least one compound selected from the group consisting of compounds of the formulae



I



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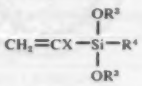

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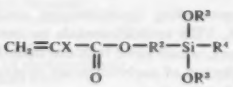

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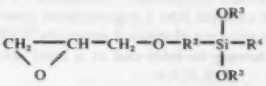
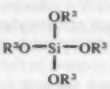


V and



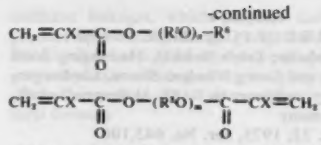
VI

wherein R^1 is an alkylene group having 2 – 6 carbon atoms, R^2 is an alkylene group having 2 – 4 carbon atoms, R^3 is an alkyl group having 1 – 4 carbon atoms, R^4 is either OR^3 or an alkyl group having 1 – 3 carbon atoms, and X is either of hydrogen and methyl;

80 – 10% by weight of at least one polymerizable compound selected from the group consisting of compounds of the formulae

VII and

-continued



wherein R^3 is an alkylene group having 2 – 3 carbon atoms, R^4 is either of hydrogen and an alkyl group having 1 – 3 carbon atoms, X is either of hydrogen and methyl, *n* is an integer of 2 – 20 and *m* is an integer of 4 – 20, and said groups R^1, R^2, R^3, R^4, R^5 and R^6 may be staight chained or branched, whereby the total of said hydrolysate and said polymerizable compounds is 100% by weight; and 0.01 – 10% based on the total weight of the above compounds of at least one curing catalyst selected from the group consisting of hydrolysis catalysts for said silicon compounds and radical polymerization initiators.

4,026,827
PREPARATION OF HIGH-MOLECULAR WEIGHT THERMOPLASTIC POLYORGANOSILICIC ACID ESTERS

Klaus-Dieter Steffen, Troisdorf, Oberlar, Germany, assignor to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany

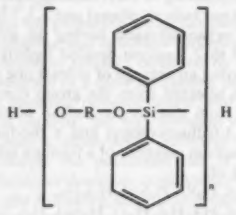
Continuation of Ser. No. 109,679, Jan. 25, 1971, abandoned. This application Nov. 14, 1972, Ser. No. 306,490

Claims priority, application Germany, Jan. 24, 1970, 2003237

Int. Cl.² C08G 77/00

U.S. Cl. 260—2 S **11 Claims**

1. Method of preparing high molecular weight polysiloxane polymers having recurring units of the formula:



$x = 1 - 3$; $n = 100 - 500$

wherein:

R is divalent arylene, or alkylene, which comprises reacting a dihydroxy compound of the formula H-O-R-OH wherein R is alkylene or arylene with diphenyl silane in the liquid phase at about 0° to 300° C in contact with a catalyst selected from the group consisting of alkali metals, alkali metal hydrides, alkali metal salts of acids whose pK-value is greater than 4 which alkali metal salts in aqueous solution react in a neutral or basic manner, Lewis bases, Lewis acids, active hydrogenation catalysts, amines having a pK-value of less than 5 and hexachloroplatinic acid, and recovering a polysiloxane polymer having between 100 and 500 recurring units.

4,026,828
FOAMED THERMOSET ARTICLES AND PROCESSES

Leonard H. Smiley, Jenkintown, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Filed June 13, 1975, Ser. No. 587,196

Int. Cl.² B29D 27/00

U.S. Cl. 260—2.5 N **10 Claims**

1. A process for preparing foamed thermoset articles comprising introducing in a mold a molding composition comprising about 90 to 98 parts by weight of a thermosettable organic resin, about 2 to 10 parts by weight blowing agent which chemically decomposes to generate gas at a temperature of about 50°–160° C. and which does not prevent complete cure of the resin, about 50 to 300 parts by weight inorganic particulate filler, about 15 to 160 parts by weight of glass fiber; molding at about 4 to 10.5 million Newtons-m^{-2} at a temperature of about 130° to 160° C. for about 0.1 to 10 seconds until the molding composition fills the mold cavity; reducing the mold pressure to about 0.51 to 2.1 million Newtons-m^{-2} without opening the mold cavity, maintaining said reduced pressure for about 30 to 300 seconds at about the same temperature so as to allow foaming at the reduced pressure, causing said foaming to be completed before gelation occurs in the mold cavity.

4,026,829
FLEXIBLE POLYURETHANE FOAM

Tetsuya Samura, Uji; Isao Ishikawa, Takatsuki, and Kozaburo Nagata, Kusatsu, all of Japan, assignors to Sanyo Chemical Industries, Ltd., Kyoto, Japan

Filed Aug. 4, 1975, Ser. No. 601,792

Claims priority, application Japan, Aug. 6, 1974, 49-90369

Int. Cl.² C08G 18/14

U.S. Cl. 260—2.5 AP **11 Claims**

1. In a process for producing a flexible polyurethane foam by reacting a polyetherpolyol and a polyisocyanate in the presence of a catalyst and a foaming agent, the improvement which comprises using, as the polyetherpolyol, a polyetherpolyol having an hydroxyl number of 25 – 80 and a primary hydroxyl group content of at least 10% based on the total hydroxyl group content, and using, as the polyisocyanate, a liquid mixture of a polyisocyanate modified by reaction with a polyoxyethylenepolyol having a molecular weight of 200 – 600 and a polyisocyanate monomer.

4,026,830
POLY[TANTALUM PHOSPHINATES]

Hyman D. Gillman, Phoenixville, and James P. King, Lansdale, both of Pa., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 18, 1975, Ser. No. 605,796

Int. Cl.² C07F 9/00; C08G 79/04

U.S. Cl. 260—2 P **5 Claims**

1. A poly[tantalum phosphinate] of the general formula: $[Ta(OPRR'O)_pZ_{5-p}]_n$ wherein $1 \leq p \leq 3$; *n* is any number; Z = Cl, Br, OCH_3, OC_2H_5, OC_3H_7, OC_4H_9, OC_6H_5, OC_6H_4Cl, $OC_6H_4CH_3$ or mixtures thereof; R and R′ = C_6H_5, $(C_6H_4)(C_6H_5)$, $(C_6H_4)(C_6H_4)(C_6H_5)$, $(C_6H_4—O—C_6H_5)$, $(C_6H_5)(C_6H_4—O—C_6H_4)$, $(C_6H_4—SO_2—C_6H_5)$, or mixtures thereof.

5. Oxide hydrates of the poly[tantalum phosphinates] of claim 1 having a general formula of $[Ta[OPRR'O]_xO_y.zH_2O]_n$ wherein $1 \leq x \leq 3$, $y = (5 - x/2$, and $0.5 \leq z \leq 2.0$.

4,026,831
CHELATING POLYMERS BASED ON BIS-EPOXIDES AND POLYAMINES OR POLYIMINES

Masafumi Moriya, Tokyo; Kazuo Hosoda, Hoya, and Makoto Takai, Chiba, all of Japan, assignors to Miyoshi Yushi Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 3, 1974, Ser. No. 511,692

Claims priority, application Japan, Oct. 5, 1973, 48-111508

Int. Cl.² C08G 65/02, 73/04; C08J 3/02

U.S. Cl. 260—2.1 R **12 Claims**

1. A chelating polymer produced by saponifying a polymer with acid or alkali, said polymer being produced by reacting a bis-epoxy compound with a poly-N-substituted polyamine or a poly-N-substituted polyalkylene imine, which polyamine or imine has been obtained by substituting an alkyl ester of a carboxyalkyl group or a cyanoalkyl group for active hydrogen atoms bonded to nitrogen atoms of a polyamine or a polyalkylene imine in a manner such that at least two of said active hydrogen atoms remain.

4,026,832

RECOVERY OF WASTE POLYMER AND PRODUCT THEREFROM

Paul W. Kollar, Elkhart, Ind., assignor to Mach 2 Mfg., Inc., Goshen, Ind.

Filed June 5, 1975, Ser. No. 583,894
Int. Cl.² C08J 11/04
U.S. Cl. 260—2.3 6 Claims

1. A process for treating waste of scrap polymer material composed of over-polymerized styrene and butadiene and containing substantial amounts of water therein to soften and render reusable such polymer material comprising the steps of:

a. loading polymer material onto a heated mill;
b. adding highly chlorinated hydrocarbon wax to said polymer of step (a), said wax containing approximately 65%–75% chemically combined chlorine;
c. releasing entrapped moisture from the polymer and thereafter adding gelled sulfamic acid to the polymer material;
d. the amount of highly chlorinated hydrocarbon wax being in the range of from 2.5%–10.0% by weight based on the weight of the polymer material and the amount of gelled sulfamic acid being in the range of from 0.1%–5.0% by weight based on the weight of the polymer material;
e. kneading said polymer material, highly chlorinated hydrocarbon wax, and gelled sulfamic acid of step (d) at an elevated temperature for a period of time sufficient to produce a lower molecular weight copolymer of styrene and butadiene containing approximately 55.0% styrene and 45.0% butadiene and
f. recovering the product of said mill.

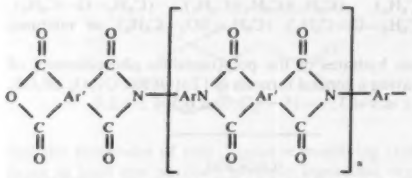
4,026,833

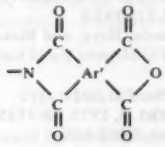
CHAIN-EXTENDING POLYIMIDES WITH AROMATIC POLYISOCYANATES

Gaetano Francis D'Alelio, South Bend, Ind., assignor to University of Notre Dame, Notre Dame, Ind.

Division of Ser. No. 363,801, May 25, 1973, Pat. No. 3,897,395. This application Mar. 14, 1975, Ser. No. 558,450
Int. Cl.² C08G 73/10
U.S. Cl. 260—25 R 8 Claims

1. A polymeric chain-extending process comprising: reacting at a temperature of about 150°–450° C. a polyimide of the formula:





wherein Ar′ is a tetravalent aromatic organic radical, the four carbonyl groups being attached directly to separate carbon atoms and each pair of carbonyl groups being attached to adjacent carbon atoms in the Ar′ radical,

Ar is a divalent aromatic organic radical,

n is a positive integer of at least 1, with at least one mole, per mole of polyimide, of an aromatic polyisocyanate of the formula $Ar(NCO)_m$ wherein Ar is an aromatic organic radical and *m* is a positive integer of 2–5.

4,026,834

MANUFACTURE OF POLYAMIDE FOAMS

Claus Cordes, Weisenheim; Erich Strickle, Mannheim; Josef Zendath, Hassloch, and Georg Nikolaus Simon, Limburgerhof, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Dec. 22, 1975, Ser. No. 643,106
Claims priority, application Germany, Jan. 3, 1975, 2500181
Int. Cl.² C08J 9/14
U.S. Cl. 260—2.5 N 2 Claims

1. In a process for the manufacture of polyamide foams by the anionic polymerization of a lactam wherein said lactam is heated in the presence of a catalyst and an activator and the resultant polymer is foamed by means of a foaming agent, the improvement which comprises carrying out said polymerization in the presence of 0.1 to 15 and preferably from 0.5 to 5% by weight of tetrachloroethylene.

4,026,835

METHOD OF PREPARING HEAT CURED SILOXANE FOAMS USING RHODIUM CATALYST AND FOAMS PREPARED THEREFROM

Chi-Long Lee, and Gary M. Ronk, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed July 14, 1975, Ser. No. 595,917
Int. Cl.² C08J 9/02
U.S. Cl. 260—2.5 S 25 Claims

1. A method of preparing a heat cured organosiloxane foam comprising mixing an organohydrogensiloxane having an average of at least three silicon-bonded hydrogen atoms per molecule, an average of no more than one silicon-bonded hydrogen atom per silicon atom and organic radicals selected from the group consisting of alkyl radicals having from one to six carbon atoms per radical, phenyl and 3,3,3-trifluoropropyl, a hydroxylated organosiloxane having an average of from greater than 1.0 to 2.5 silicon-bonded hydroxyl radicals per molecule and having an average of at least one organic radical per silicon atom selected from the group consisting of alkyl radicals having from one to six carbon atoms per radical, phenyl and 3,3,3-trifluoropropyl and a rhodium catalyst selected from a rhodium complex of a formula selected from the group consisting of:

$RhCl_3(S(CH_2CH_3)\{CH_2Si(CH_3)_3\})_3$,
$RhCl_3(S(CH_2CH_2CH_2CH_3)\{CH_2Si(CH_3)_3\})_3$,
$RhCl\{(CH_3CH_2)_2S\}_3$,
$RhCl_3\{(CH_3CH_2CH_2CH_2)_2S\}_3$,
$Rh_2Cl_6(P(CH_3)\{CH_2Si(CH_3)_3\}_2)_3$,
$Rh_2Cl_6(P(CH_3)\{CH_2Si(CH_3)_3\}_2)_4$,
$RhCl_2(P(C_6H_5)_2\{CH_2Si(CH_3)_3\})_3$,
$RhCl(CO)(P(CH_3)\{CH_2Si(CH_3)_3\}_2)_2$
and
$RhCl(CO)\{P(C_6H_5)_3\}_2$,

said rhodium catalyst being present in an amount of at least 0.0025 grams per 100 grams of the hydroxylated organosiloxane, said organohydrogensiloxane and said hydroxylated organosiloxane being present in sufficient amounts to provide a molar ratio of silicon-bonded hydrogen atoms to silicon-bonded hydroxyl radicals of 2.5 to 40, where a mixture is obtained having a viscosity of less than 100,000 cps. at 25° C. and a pot life of at least 8 hours, thereafter heating said mixture above 90° C. to form a foam.

4,026,836

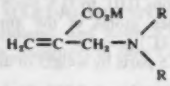
ISOCYANURATE FOAM CATALYST

Robert L. Zimmerman; Edward E. McEntire, and Howard P. Klein, all of Austin, Tex., assignors to Texaco Development Corporation, New York, N.Y.

Filed Dec. 29, 1975, Ser. No. 644,494
Int. Cl.² C08J 9/00
U.S. Cl. 260—2.5 AC 10 Claims

1. A cellular polymer containing recurring isocyanurate and

urethane linkages, which polymer comprises the reaction product obtained by bringing together in the presence of a blowing agent, a polyether or polyester polyol and an aromatic polyisocyanate utilizing as an isocyanurate group formation catalyst an aminomethacrylate salt having the following structural formula:



where the radicals represented by R when taken singly are lower alkyl, and hydroxy lower alkyl, and when taken together with the adjacent nitrogen atom are selected from the group consisting of morpholino, C-substituted morpholino N-alkylpiperazino, and C-substituted N-alkylpiperazino and M is selected from the group consisting of sodium, potassium, cesium, lithium and rubidium.

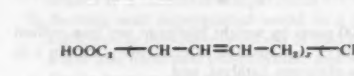
4,026,837

POLYMERIC ACID SALTS AS ISOCYANURATE FOAM CATALYSTS

Robert LeRoy Zimmerman, and Thomas Howard Austin, both of Austin, Tex., assignors to Texaco Development Corporation, New York, N.Y.

Filed Sept. 19, 1975, Ser. No. 614,810
Int. Cl.² C08G *18/14*
U.S. Cl. 260—2.5 AB **9 Claims**

1. In a process for preparing a cellular polymer containing recurring isocyanurate and urethane linkages which polymer comprises the reaction product obtained by the bringing together in the presence of a blowing agent a polyether or polyester polyol, an aromatic polyisocyanate, and an isocyanurate group formation catalyst; the improvement which comprises utilizing in at least a catalytically effective amount as said isocyanurate catalyst the potassium salt of a carboxyl-terminated butadiene-acrylonitrile copolymer, said copolymer represented by the following structural formula:



where *x* may range from 1 to 10, *y* is 1, and *m* may range from about 7 to 13, said copolymer having an average molecular weight range of 2500–4500.

4,026,838

SMOKE-SUPPRESSANT ADDITIVES FOR POLYPHOSPHAZENES

Ronald L. Dieck, and Edwin J. Quinn, both of Lancaster, Pa., assignors to Armstrong Cork Company, Lancaster, Pa.

Filed Aug. 6, 1976, Ser. No. 712,149
Int. Cl.² C08J *9/10*
U.S. Cl. 260—2.5 FP **14 Claims**

1. A smoke suppressed poly(aryloxyphosphazene) foam composition comprising a poly(aryloxyphosphazene) foam material; and incorporated in said foam in an amount sufficient to reduce the smoke levels of said foam when burned, a normally solid carboxylic acid.

4,026,839

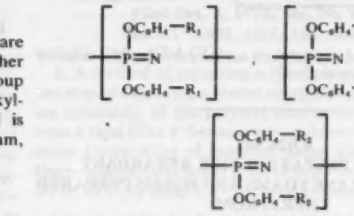
POLYPHOSPHAZENE POLYMER/SILICONE RUBBER BLENDS AND FOAMS THEREFROM

Ronald L. Dieck, and Edwin J. Quinn, both of Lancaster, Pa., assignors to Armstrong Cork Company, Lancaster, Pa.

Filed Aug. 30, 1976, Ser. No. 718,412
Int. Cl.² C08J *9/10*
U.S. Cl. 260—2.5 FP **8 Claims**

1. A foamed blend comprising:

A. a polyphosphazene comprising randomly distributed repeating units represented by the formulas:



wherein R_1 and R_2 are the same or different and are hydrogen, a C_3- C_{10} linear or branched alkyl radical, or a C_1 - C_4 linear or branched alkoxy radical substituted on any sterically permissible position on the phenoxy group,

B. a poly(organosiloxane) elastomer,

C. said polymer (A) being present in an amount of about 15% to about 85% by weight and said polymer (B) being present in an amount of about 85% to about 15% by weight, based on the combination of (A) and (B).

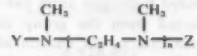
4,026,840

HYDROXYALKYL TERTIARY AMINE CATALYSTS FOR ISOCYANATE REACTIONS

Ibrahim S. Bechara, Boothwyn; Felix P. Carroll, Chester, and Rocco L. Mascioli, Media, all of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed June 9, 1975, Ser. No. 585,327
Int. Cl.² C08G *18/16*
U.S. Cl. 260—2.5 AC **11 Claims**

1. The method of promoting addition and polymerization reactions of organic isocyanates by basic catalysis which comprises: effecting such reactions in the presence of a catalytic amount of a hydroxyalkyl tertiary amine compound of the formula



wherein Y is CH_3 or Z, Z is $-C_2H_4OH$, and *n* is 1 or 2.

4,026,841

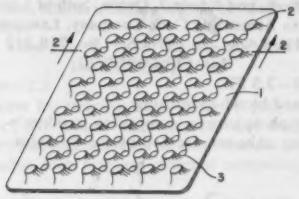
MOLDING MATERIAL HAVING SUPERIOR BUFFERING CHARACTER

Masami Tomikawa; Akiji Tsunoda; Hideo Ohkawa; Kazuhisa Kaneda, and Yutaka Mugino, all of Chiba, Japan, assignors to Idemitsu, Kosan Kabushiki-Kaisha (Idemitsu Kosan Co., Ltd.), Tokyo, Japan

Continuation of Ser. No. 370,675, June 18, 1973, abandoned. This application July 21, 1975, Ser. No. 597,356
Claims priority, application Japan, May 24, 1974, 49-5432247
Int. Cl.² C08J *9/10*
U.S. Cl. 260—2.5 HA **2 Claims**

1. A foamed body of improved cushioning moldability, and dimensional stability consisting essentially of (1) about 80–10% by weight of a cross-linked foamed matrix of ethylene polymer and (2) distributed homogeneously within the poly-

mer of said matrix about 20–90% by weight of a filler consisting of (a) sand having a particle size in the range of about



100–500 microns and (b) calcium sulfite particles in a ratio by weight of about 1:5–5:1.

4,026,842

METHOD OF PREPARING FIRE RETARDANT OPEN-CELL SILOXANE FOAMS AND FOAMS PREPARED THEREFROM

Chi-Long Lee, and Gary M. Ronk, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed July 14, 1975, Ser. No. 595,915
Int. Cl.² C08J *9/02*
U.S. Cl. 260—2.5 S **35 Claims**

1. In a method of preparing an organosiloxane foam comprising mixing an organohydrogensiloxane having an average of at least three silicon-bonded hydrogen atoms per molecule, an average of no more than one silicon-bonded hydrogen atom per silicon atom and organic radicals selected from the group consisting of alkyl radicals having from one to six carbon atoms per radical, phenyl and 3,3,3-trifluoropropyl, a hydroxylated organosiloxane having an average of from greater than 1.0 to 2.5 silicon-bonded hydroxyl radicals per molecule and having an average of at least one organic radical per silicon atom selected from the group consisting of alkyl radicals having from one to six carbon atoms per radical, phenyl and 3,3,3-trifluoropropyl and a platinum catalyst in an amount of from 1 to 200 parts by weight platinum per one million parts by weight total composition, said organohydrogensiloxane and said hydroxylated organosiloxane being present in sufficient amounts to provide a molar ratio of silicon-bonded hydrogen atoms to silicon-bonded hydroxyl radicals of 2.5 to 7, where a mixture is obtained having a viscosity of less than 100,000 cps. at 25° C., thereafter allowing a foam to form, the improvement consisting essentially of having present in said mixture an organomonohydrogensiloxane having one silicon-bonded hydrogen atom per molecule and organic radicals selected from the group consisting of alkyl radicals having from one to six carbon atoms per radical, phenyl and 3,3,3-trifluoropropyl, said organomonohydrogensiloxane being present in an amount sufficient enough to provide a molar ratio of silicon-bonded hydrogen atoms from the organohydrogensiloxane to silicon-bonded hydrogen atoms from the organomonohydrogensiloxane of from 0.4 to 2 and the molar ratio of total silicon-bonded hydrogen atoms present in the mixture to silicon-bonded hydroxyl radicals remaining within the limits of 2.5 to 7.

4,026,843

FOAMABLE SILICONE GUM STOCK HAVING LESS SKIN THICKNESS

Ronald E. Kittle, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed July 14, 1975, Ser. No. 595,920
Int. Cl.² C08J *9/02*
U.S. Cl. 260—2.5 S **5 Claims**

1. A silicone foam composition comprising

A. 100 parts by weight of a polydiorganosiloxane gum base stock wherein the gum has a Williams plasticity of greater than 0.030 inch,

B. from 5 to 30 parts by weight of an organic alcohol having one C—OH per molecule selected from the group consisting of methanol, ethanol, propanol, isopropanol, butanol, hexanol, cyclohexanol, pentanol and octanol,

C. from 3 to 25 parts by weight of an organohydrogensiloxane having an average of at least 2.5 silicon-bonded hydrogen atoms per molecule, where the organohydrogensiloxane has from 0.01 to 0.5 parts by weight silicon-bonded hydrogen atoms in the amount of organohydrogensiloxane (C) present,

D. from 0.05 to 0.5 parts by weight of an acetylenic alcohol inhibitor, and

E. from 5 to 20 parts by weight platinum per one million parts by weight silicone composition wherein the platinum is in the form of a platinum catalyst.

4,026,844

METHOD OF FOAMING A SILOXANE COMPOSITION USING MICROWAVE ENERGY

Ronald E. Kittle, and Gary M. Ronk, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed July 14, 1975, Ser. No. 595,919
Int. Cl.² C08J *9/02*
U.S. Cl. 260—2.5 S **3 Claims**

1. A method of foaming a silicone composition comprising mixing

A. 100 parts by weight of a polydiorganosiloxane gum base stock wherein the gum has a Williams plasticity of greater than 0.030 inch,

B. from 0 to 60 parts by weight of an organosiloxane having an average of at least 2 silicon-bonded hydroxyl radicals per molecule, where the organosiloxane (B) has from 0.5 to 3 parts by weight silicon-bonded hydroxyl radicals in the amount of organosiloxane (B) present, only when the microwave sensible material of (F) is an organic alcohol can the organosiloxane of (B) be zero,

C. from 3 to 25 parts by weight of an organohydrogensiloxane having an average of at least 2.5 silicon-bonded hydrogen atoms per molecule, where the organohydrogensiloxane has from 0.01 to 0.5 parts by weight silicon-bonded hydrogen atoms in the amount of organhydrogensiloxane (C) present,

D. from 0.05 to 0.5 parts by weight of an acetylenic alcohol inhibitor,

E. from 1 to 200 parts by weight platinum per one million parts by weight of composition wherein the platinum is in the form of a platinum catalyst, and

F. from 0.25 to 30 parts by weight of a microwave sensible material and thereafter

exposing the mixture to a microwave source to obtain a silicone foam.

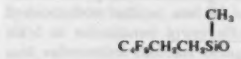
4,026,845

METHOD OF REDUCING THE FOAM DENSITY OF SILICONE FOAMS AND COMPOSITIONS

Yung K. Kim; Chi-Long Lee, and Gary M. Ronk, all of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed July 14, 1975, Ser. No. 595,912
Int. Cl.² C08J *9/02*
U.S. Cl. 260—2.5 S **11 Claims**

1. A method of reducing the density of a silicone foam comprising mixing with a foamable silicone composition having a base polydiorganosiloxane, a fluorinated surfactant selected from the group consisting of perfluorinated polyethers and silicon-containing fluorinated surfactants having repeating units of the formulae



and foaming and curing to obtain a cured silicone foam.

4,026,846

SILICONE RUBBER SPONGE COMPOSITION, METHOD OF MAKING THE SPONGE

Ronald E. Kittle, Midland, and Keith E. Polmanteer, Weidman, both of Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed July 3, 1975, Ser. No. 592,961
Int. Cl.² C08J 9/10
U.S. Cl. 260—2.5 S 7 Claims

1. In a method for making a silicone rubber sponge comprising heating a silicone rubber composition consisting essentially of a polydiorganosiloxane gum having organic groups selected from the group consisting of methyl, phenyl, vinyl, and mixtures thereof and has at least 90 percent of the organic groups being methyl, a reinforcing silica filler, an organic peroxide and 4,4′-oxybis(benzenesulfonhydrazide) above the activation temperature of the organic peroxide and the activation temperature of the 4,4′-oxybis(benzenesulfonhydrazide) whereby the blowing process and the vulcanization process take place at substantially the same time to obtain a silicone rubber sponge, the improvement consisting essentially of having present in the silicone rubber composition a finely divided metal oxide selected from the group consisting of magnesium oxide, calcium oxide, and mixtures thereof.

4,026,847

METHOD OF PARTIALLY CONVERTING WOOD INTO A LIGNIN PLASTIC POLYMER

Rodolfo Ripa, and Alberto Garcia, both of Valparaiso, Chile, assignors to Universidad Tecnia Federico Santa Maria, Valparaiso, Chile

Filed May 13, 1975, Ser. No. 577,038
Int. Cl.² C08L 1/00
U.S. Cl. 260—17.2 9 Claims

1. The method of partially converting wood into a plastic material which comprises the steps of

a. impregnating said wood with a liquid containing taxogens having a molecular weight less than 200 which form a pre-polymer that will react with lignin in the wood when heated to a sufficient temperature,

b. heating said impregnated wood to a first temperature sufficient to remove any excess of said taxogens from the wood and form said pre-polymer, and

c. finally heating said impregnated wood to a temperature and for a time sufficient to cause a reaction resulting in the formation of a co-polymer between the pre-polymer and the lignin in the wood.

4,026,848

AQUEOUS PHENOLIC RESOLE DISPERSION CONTAINING GUM GHATTI INTERFACIAL AGENT

James Harding, Green Brook, and Neil Justin McCarthy, Jr., Warren Township, both of N.J., assignors to Union Carbide Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 495,139, Aug. 6, 1974, abandoned. This application Oct. 21, 1975, Ser. No. 624,561
Int. Cl.² C08L 5/00
U.S. Cl. 260—17.2 11 Claims

1. An aqueous dispersion containing dispersed particles of a phenolic resole in water, gum ghatti, and a thickening agent, substantially all of said particles having diameters below about 25 microns, wherein the molecular weight of said resole is such that said resole is substantially water-insoluble, wherein said gum ghatti is employed in an amount sufficient to stabilize said dispersion of resole particles in water, and wherein the thickening agent is employed in an amount such that the viscosity of said dispersion at 23° C. is at least about 500 centipoises.

4,026,849

COMPOSITE COMPOSITIONS FROM GRAFT POLYMERIZED RIGID FILLERS

Edward B. Bagley, Morton; George F. Fanta, Peoria; William M. Doane, Morton; Lewis A. Gugliemelli, Pekin, and Charles R. Russell, Peoria, all of Ill., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Oct. 3, 1975, Ser. No. 619,412
Int. Cl.² C08L 1/02, 3/02; B28B 3/20
U.S. Cl. 260—17.4 GC 8 Claims

1. A method of preparing a filled plastic article comprising the step of extruding a plastic composite composition consisting essentially of the polymer matrix resulting from grafting onto a rigid filler a thermoplastic polymer having a glass transition temperature of less than about 200° C., wherein said thermoplastic polymer is present in an amount equal to from 20 to 95%, by weight, of the total composition.

4,026,850

THIXOTROPIC URETHANE ALKYD RESINS

Walter Frank; Karl Raichle, and Eberhard Kreiss, all of Krefeld, Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed Aug. 18, 1975, Ser. No. 605,721
Claims priority, application Germany, Aug. 22, 1974, 2440267
Int. Cl.² C08G 18/68, 63/68; C09D 3/72, 5/04
U.S. Cl. 260—22 TN 4 Claims

1. A thixotropic urethane alkyd resin which dries under oxidizing conditions and is obtainable by reacting a mixture of:

a. at least one member selected from the group consisting of OH-containing partial esters of polyhydric alcohols and long chain unsaturated fatty acids and OH-containing oligoesters of polyhydric alcohols, long chain unsaturated fatty acids and polycarboxylic acids and

b. an OH-containing fatty acid modified dimeric fatty acid polyester amide containing from 0.1 to 1.5 mol of ester groups and from 0.2 to 0.9 mol of hydroxyl groups per mol of carbonamide groups with a diisocyanate in such amounts that the number of OH groups in the reaction is equal to or greater than the number of isocyanate groups.

4,026,851

ACRYLATE POLYMERS CURED WITH DIAMINES IN THE PRESENCE OF AN ACID CATALYST

Robin Nikolas Greene, New Albany, Ind., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 605,711, Aug. 13, 1975, abandoned. This application Oct. 29, 1975, Ser. No. 626,756
Int. Cl.² C08F 8/00
U.S. Cl. 260—23 AR 14 Claims

1. A composition consisting essentially of:

a. about 100 parts by weight of an acrylate, ethylene/acrylate or ethylene/methacrylate/acrylate polymer containing at least 25 weight percent of C_1–C_4 alkyl acrylate units,

b. about 0.5–10 parts by weight of at least one C_8–C_{12} diprimary amine, and

c. about 0.5–10 parts by weight of at least one acid selected from

i. C_4–C_{25} α-carbon atom branched aliphatic acids, and

ii. aromatic acids whose pK_A in aqueous solution is at least 3.0.

4,026,852

HIGH TEMPERATURE POLYVINYL CHLORIDE COMPOSITIONS

Edward L. White, Freehold, and Edward J. Augustyn, Yardville, both of N.J., assignors to N L Industries, Inc., New York, N.Y.

Filed Feb. 10, 1975, Ser. No. 548,270

The portion of the term of this patent subsequent to July 16, 1993, has been disclaimed.

Int. Cl.² C08K 3/30

U.S. Cl. 260—23 XA 11 Claims

1. In a high temperature polyvinyl chloride thermoplastic composition characterized by resistance to penetration plus retention of elongation and tensile strength at least as high as 125° C. wherein a stabilizer-filler additive is combined with a polyvinyl chloride resin having an inherent viscosity of at least 1.1, a low volatile plasticizer in amounts from 20 to 60 parts, said plasticizer having a vapor pressure at least as low as about 0.2 dynes/cm² at 160° C., and an antioxidant selected from the group consisting of 2,2'-bis(4-hydroxy phenyl)propane, dilaurylthiodipropionate and mixtures thereof the improvement comprising: a stabilizer-filler additive wherein the stabilizer is selected from the group consisting of normal and basic lead compounds, organo-tin compounds, lead-barium compounds and barium-cadmium compounds said filler comprising an alkaline earth metal sulfate having a specific gravity less than 3.0 and added in amounts less than 40 to as low as 15 parts, all parts based on 100 parts resin.

4,026,853

CURABLE BITUMINOUS ORGANOPOLYSILOXANE COMPOSITIONS

Günter Dressnandt; Hermann Meyer, both of Munich; Walter Keil, Planegg; Oswin Sommer, Burghausen; Klaus Marquardt, Krailling; Franz Heinrich Kreuzer, Munich, and Eckhart Louis, Burghausen, all of Germany, assignors to Consortium fur Elektrochemische Industrie GmbH, Munich, Germany

Filed Nov. 19, 1975, Ser. No. 633,196

Claims priority, application Germany, Nov. 20, 1974, 2455004

Int. Cl.² C08L 91/00

U.S. Cl. 260—28.5 AS 39 Claims

1. A bituminous composition comprising a bituminous material and a modified diorganopolysiloxane in which the diorganopolysiloxane is linked to at least one organic polymer chain and is capable of being cross-linked, said diorganopolysiloxane is present in an amount of from 0.5 to 95 percent by weight based on the total weight of the composition.

4,026,854

MOLDING COMPOSITIONS BASED ON BITUMEN AND OLEFIN COPOLYMERS

Oskar Buechner, Ludwigshafen, Germany; Leo Unterstenhoefer, deceased, late of Limburgerhof, Germany (by Ilse Unterstenhoefer, authorized representative of the heirs); Heinz Mueller-Tamm, and Woltram Rainer Kroll, both of Ludwigshafen, Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed June 6, 1975, Ser. No. 584,373

Claims priority, application Germany, Dec. 29, 1976, 2435753

Int. Cl.² C08L 95/00

U.S. Cl. 260—28.5 AS 2 Claims

1. Non-tacky molding compositions comprising

a. from 10 to 90 parts by weight of bitumen,

b. from 90 to 10 parts by weight of a copolymer of an olefin and an olefinically unsaturated carboxylic ester,

c. from 0.1 to 10 parts by weight of a substituted aromatic compound selected from the group consisting of dimethyl terephthalate, phthalonitrile, phthalic acid, phthalic anhydride, and benzoic acid.

4,026,855

COMPOSITION OF MATTER PARTICULARLY ADAPTABLE FOR USE IN ELECTRODEPOSITING FILMS ON METAL

Girish Girdhar Parekh, Stamford, and Werner Josef Blank, Wilton, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 525,134, Nov. 19, 1974, abandoned, which is a continuation of Ser. No. 370,257, June 15, 1973, abandoned. This application Oct. 20, 1975, Ser. No. 623,872

Int. Cl.² C08G 51/24

U.S. Cl. 260—29.4 UA 9 Claims

1. A composition of matter comprising an aqueous dispersion of a mixture from about 4% to 50%, by weight, of (A) an ungelled modified cross-linking agent, having a pKa value of 3.6 or lower, comprising an aminoplast cross-linking agent modified by reaction with a non-resinous hydroxyl-group containing carboxylic acid, wherein the mol ratio of said unmodified cross-linking agent to said non-resinous hydroxyl-group containing carboxylic acid is between 1:0.1 and 1:1 respectively, from about 40% to about 90%, by weight, of (B) a water dispersible non-gelled polymeric material carrying a cationic charge and having a pKb value above 5.5, which polymeric material contains at least one class of reactive groups, selected from the group consisting of carboxyl groups, alcoholic hydroxy groups and amide groups and said polymeric material also contains amino groups wherein the total amount of said groups is at least about 0.5%, by weight, and not more than about 15%, by weight, based on the total weight of the polymeric material, wherein the total amount of said amino groups is at least about 0.25% and not greater than about 5%, by weight, based on the total weight of said polymeric material wherein said carboxyl groups, alcoholic hydroxy groups and amide groups are heat reactive with (A), and from about 1% to about 10%, by weight, of (C) an acid solubilizer, wherein the said percentages of (A), (B) and (C), by weight, total 100% and are based on the total solids weight of (A), (B) and (C).

4,026,856

ADHESIVES PREPARED FROM ALKALINE REAGENTS AND POLYMERS OF WATER-SOLUBLE HYDROXYALKYLATED AND ALKOXYALKYLATED COMPOSITIONS AND THE LIKE DERIVED FROM N-3-OXOHYDROCARBON-SUBSTITUTED ACRYLAMIDES

Richard William Jahnke, Mentor-on-the-Lake, Ohio, assignor to The Lubrizol Corporation, Cleveland, Ohio

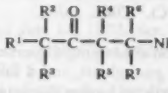
Continuation of Ser. No. 111,678, Feb. 1, 1971, abandoned. This application Dec. 8, 1972, Ser. No. 313,217

Int. Cl.² C08L 61/20

U.S. Cl. 260—29.4 R 6 Claims

1. A composition comprising an alkaline reagent and an aqueous addition interpolymer emulsion containing units derived from a water-soluble composition of matter consisting essentially of:

A. compounds of the formula



wherein each of R^1, R^2, R^3, R^4 and R^5 is hydrogen, a hydrocarbon or substituted hydrocarbon radical, a hydroxyalkyl radical having not more than 4 carbon atoms, or an alkoxy derivative of said hydroxyalkyl radical, at least one of R^1, R^2, R^3, R^4 and R^5 being a hydroxyalkyl radical or alkoxy derivative thereof;

each of R^6 and R^7 is hydrogen or a hydrocarbon or substituted hydrocarbon radical; and R^8 is hydrogen, halogen or a lower alkyl or substituted lower alkyl radical; the substituents on said substituted radicals being halide, ether, keto, carboxy, ester, amide, nitro, cyano, thioether, sulfoxy or sulfone groups; and

B. condensation dimers and trimers of said compounds.

4,026,857

EPOXY EMULSION WATER-BASED COATING

George L. Brown, Scotch Plains, and Carlos J. Martinez, Edison, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 580,458, May 23, 1975, abandoned. This application Aug. 1, 1975, Ser. No. 600,999

Int. Cl.² C08G 51/24

U.S. Cl. 260—29.4 R 17 Claims

1. An oil-in-water emulsion coating formulation containing in parts by weight:

a. 100 parts of epoxy resin having an epoxy equivalent weight between about 400 and about 6,000 or of a mixture of two or more epoxy resins each having an epoxy equivalent weight falling within the range of between about 400 and 6,000;

b. about 25 to 160 parts of an alkoxyethanol solvent having the formula $ROCH_2CH_2OH$, wherein R is C_3–C_7 alkyl or a mixture of said alkoxyethanol and a co-solvent, selected from the group consisting of alcohols, ketones, and carbitols containing at least about 50 weight per cent alkoxyethanol;

c. about 2–15 parts non-ionic surfactant;

d. about 0 to 2 parts of an acid cross-linking catalyst;

e. about 1 to 30 parts of a conventional curing agent for an epoxy resin; and

f. about 140 to 300 parts of water.

4,026,858

CURABLE EPOXIDE RESIN COMPOSITIONS

Christopher Michael Andrews, and Bryan Dobinson, both of Cambridge, England, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Oct. 28, 1975, Ser. No. 626,595

Claims priority, application United Kingdom, Nov. 7, 1974, 48247/74

Int. Cl.² C08G 59/56

U.S. Cl. 260—30.2 10 Claims

1. A curable composition comprising

a. an epoxide resin

b. a curing amount of an aromatic or cycloaliphatic polyamine containing at least three hydrogen atoms per molecule attached to amino nitrogen atoms, at least two of which hydrogen atoms are attached to, respectively, aromatic or cycloaliphatic amino nitrogen, and

c. a perchlorate selected from magnesium, calcium, zinc, manganese, cobalt, and nickel perchlorates.

4,026,859

THERMOSETTING COMPOSITIONS CONTAINING POLY(ARYLACETYLENES)

Lawrence C. Cessna, Jr., Newark, Del., assignor to Hercules Incorporated, Wilmington, Del.

Continuation-in-part of Ser. No. 476,124, June 3, 1974, Pat. No. 3,904,574, which is a continuation-in-part of Ser. No. 316,332, Dec. 18, 1972, Pat. No. 3,882,073. This application May 27, 1975, Ser. No. 580,658

Int. Cl.² C08K 5/15

U.S. Cl. 260—30.4 R 8 Claims

1. A thermosetting composition comprising a blend of (1) a prepolymer of at least one polyacetylenically substituted aromatic compound, said prepolymer having a number average molecular weight from about 900 to about 12,000, a ratio of aromatic protons to olefinic protons greater than about 2.4 and containing from about 5 to about 20% acetylenic groups by weight of the prepolymer, with (2) from about 2 to about 200%, by weight of the prepolymer, of at least one aromatic organic compound containing at least two six-membered aromatic rings, said rings being unsubstituted or methylsubstituted, said rings being condensed with each other and coupled directly through a single oxygen atom or each ring being coupled directly through a single oxygen atom, said compound or mixtures thereof containing no crystalline organic phase at 220° C. having a viscosity of less than 20 centipoises at 220° C. and containing no more than 5% of material volatile at 240° C. when distilled according to the procedure of ASTM D20-56.

4,026,860

THERMOSETTING COMPOSITIONS CONTAINING POLY(ARYLACETYLENES)

Lawrence C. Cessna, Jr., Newark, Del., assignor to Hercules Incorporated, Wilmington, Del.

Continuation-in-part of Ser. No. 476,124, June 3, 1974, Pat. No. 3,904,574, which is a continuation-in-part of Ser. No. 316,332, Dec. 18, 1972, Pat. No. 3,882,073. This application May 27, 1975, Ser. No. 580,657

Int. Cl.² C08K 5/49

U.S. Cl. 260—30.6 R 8 Claims

1. A thermosetting composition comprising a blend of (1) a prepolymer of at least one polyacetylenically substituted aromatic compound, said prepolymer having a number average molecular weight from about 900 to about 12,000, a ratio of aromatic protons to olefinic protons greater than about 2.4 and containing from about 5 to about 20% acetylenic groups by weight of the prepolymer, with (2) from about 2 to about 200%, by weight of the prepolymer, of at least one aromatic organic compound containing at least two six-membered aromatic rings, said rings being unsubstituted or methylsubstituted, said rings being condensed with each other and coupled directly through a single phosphorus atom or each ring being coupled directly through a single phosphorus atom, said compound or mixtures thereof containing no crystalline organic phase at 220° C., having a viscosity of less than 20 centipoises at 220° C. and containing no more than 5% of material volatile at 240° C. when distilled according to the procedure of ASTM D20-56.

4,026,861

THERMOSETTING COMPOSITIONS CONTAINING POLY(ARYLACETYLENES)

Lawrence C. Cessna, Jr., Newark, Del., assignor to Hercules Incorporated, Wilmington, Del.

Continuation-in-part of Ser. No. 476,124, June 3, 1974, Pat. No. 3,904,574, which is a continuation-in-part of Ser. No. 316,332, Dec. 18, 1972, Pat. No. 3,882,073. This application May 27, 1975, Ser. No. 580,659

Int. Cl.² C08K 5/36

U.S. Cl. 260—30.8 R 9 Claims

1. A thermosetting composition comprising a blend of (1) a prepolymer of at least one polyacetylenically substituted aromatic compound, said prepolymer having a number average molecular weight from about 900 to about 12,000, a ratio of aromatic protons to olefinic protons greater than about 2.4 and containing from about 5 to about 20% acetylenic groups by weight of the prepolymer, with (2) from about 2 to about 200%, by weight of the prepolymer, of at least one aromatic organic compound containing at least two six-membered aromatic rings, said rings being unsubstituted or methyl-substituted, said rings being condensed with each other and coupled directly through a single sulfur atom or each ring being coupled directly through a single sulfur atom, said compound or mixtures thereof containing no crystalline organic phase at 220° C., having a viscosity of less than 20 centipoises at 220° C. and containing no more than 5% of material volatile at 240° C. when distilled according to the procedure of ASTM D20-56.

4,026,862
CARBOXYLIC ACID STORAGE STABILIZERS FOR LATENT CATALYST CURED EPOXY RESINS

James D. B. Smith, Turtle Creek, and Robert N. Kauffman, Monroeville, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 11, 1974, Ser. No. 441,605

Disclosure published under the second Trial Voluntary Protest Program on Feb. 3, 1976

Int. Cl.² C08G *51/04, 30/12*

U.S. Cl. 260—37 EP **13 Claims**

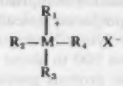
1. A fluid, stabilized, resinous composition for insulating electrical members comprising by weight:

A. 100 parts of an epoxy resin containing more than one 1,2 epoxy group per molecule,

B. 55 to 165 parts of an anhydride of a polycarboxylic acid as a curing agent,

C. 1 to 20 parts of a mono-carboxylic acid selected from the group consisting of acetic, propionic, butyric, isobutyric, valeric, caproic, and heptanoic acids acting as a stabilizer to increase storage lifetime and,

D. an effective amount of a latent catalyst selected from the group consisting of amines, imidazoles and quaternary organic onium salts having the structural formula:



where M is selected from the group consisting of N and P, R_1, R_2, R_3 and R_4 are selected from the group consisting of alkyl and aryl radicals having 1 to 21 carbon atoms and X is selected from the group consisting of halogen, propionate, acetate, butyrate, isobutyrate and dimethyl phosphate radicals.

4,026,863
FLUOROCARBON POLYMER COMPOSITE CONTAINING A TREATED FILLER

Shigeru Iseki, Tokyo; Mituharu Morozumi, Yokohama, and Shoji Atsuta, Kyoto, all of Japan, assignors to Asahi Glass Co., Ltd., Tokyo, Japan

Filed June 7, 1976, Ser. No. 693,684

Int. Cl.² C08K *9/04*

U.S. Cl. 260—42.14 **14 Claims**

1. A fluorocarbon polymer composite which comprises a fluorocarbon polymer and a filler treated with polyphenylene sulfide wherein said polyphenylene sulfide is applied on the surface of the filler and is present in an amount within the range of from 0.5 to 10 weight percent based on the filler.

4,026,864
PROCESS FOR THE MANUFACTURE OF AMINOPLAST AND PHENOPLAST MOULDING COMPOSITIONS USING A FLUIDIZED BED DRIER

Hermann Diethelm, Aesch; Peter Ruf, Binningen, and Willi Zummerli, Ollon, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Nov. 5, 1974, Ser. No. 521,105

Claims priority, application Switzerland, Nov. 5, 1973, 15559/73

Int. Cl.² C08J *3/12*

U.S. Cl. 260—38 **7 Claims**

1. A process for the manufacture of aminoplast or phenoplast moulding compositions, characterised in that an aqueous solution of a urea-formaldehyde resin, of a melamine-formaldehyde resin, or a phenol-modified melamine-formaldehyde resin or of a phenol-formaldehyde resin is passed, optionally after addition of pigments, into a fluidised bed drier, there sprayed onto fillers and dried at a temperature at which the resin does not fuse completely.

4,026,865
PREPARATION OF ORGANOMETAL TERMINATED POLYMERS

Carl A. Uraneck, and Richard L. Smith, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 484,692, July 1, 1974, which is a division of Ser. No. 307,773, Nov. 20, 1972, Pat. No. 3,845,030, which is a continuation of Ser. No. 92,214, Nov. 23, 1970, abandoned. This application Jan. 19, 1976, Ser. No. 649,950

Int. Cl.² C08F *36/04, 36/06, 236/04, 236/10*

U.S. Cl. 260—42.32 **20 Claims**

1. A polymer of a monomer selected from the group consisting of conjugated dienes and conjugated dienes in admixture with vinyl-substituted aromatic compounds, wherein said polymer contains at least one terminal $R_{(z-1)}MX$— group per polymer molecule, wherein R is a hydrocarbon radical containing up to 12 carbon atoms, M is a metal selected from Groups 2*b*, 4*a*, and 5*a*, and *z* is an integer equal to the valence of M.

4,026,866
NICKEL STABILIZERS FOR SYNTHETIC POLYMERS

Michael Rasberger, Allschwil; Johann Rody, Basel; Paul Moser, Riehen, and Helmut Müller, Binningen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 370,180, June 14, 1973, Pat. No. 3,901,931. This application June 13, 1975, Ser. No. 586,826

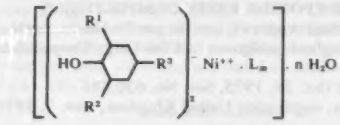
Claims priority, application Switzerland, June 21, 1972, 9333/72

The portion of the term of this patent subsequent to Aug. 26, 1992, has been disclaimed.

Int. Cl.² C07F *15/04*

U.S. Cl. 260—45.75 N **11 Claims**

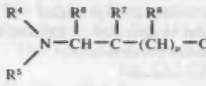
1. Compounds of the formula



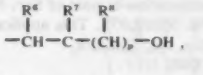
(1)

wherein R^1 represents hyrogen or alkyl with 1 to 5 carbon atoms, and one of the substituents R^2 and R^3 represents an alkyl radical with 3 to 8 carbon atoms and the other represents $—COO^-$, *m* is a number from 1 to 2, *n* is a number from from 0 to 2, and L is a ligand

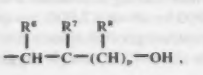
a. of the formula



wherein R^4 represents hydrogen, alkyl with 1 to 4 carbon atoms, cycloalkyl with 5 to 10 carbon atoms, aryl with 6 to 10 carbon atoms, or represents a radical of the formula

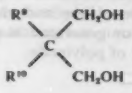


R^5 represents hydrogen, alkyl with 1 to 4 carbon atoms or the radical of the formula



R^6, R^7 and R^8 represent hydrogen or one of R^6, R^7 and R^8 represents alkyl with 1 to 4 carbon atoms, and p is 0 or 1, or

b. of the formula

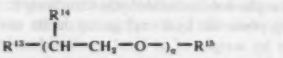


wherein R^9 represents hydrogen, alkyl with 1 to 4 carbon atoms, —OH, NH_2, $-CH_2OCH_2C(CH_2OH)_3$ or $-CH_2-OH$, and R^{10} represents hydrogen, $-CH_2OH$ or alkyl with 1 to 4 carbon atoms, or

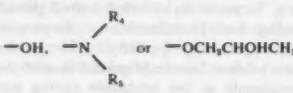
c. of the formula

wherein R^{11} represents hydrogen, alkyl with 1 to 4 carbon atoms or $-CH_2OR^{12}$, and R^{12} represents hydrogen, alkyl with 1 to 18 carbon atoms, or phenyl, or

d. of the formula



wherein R^{13} represnts



R^{14} represents hydrogen or alkyl with 1 to 4 carbon atoms, R^{15} represents hydrogen or alkyl with 1 to 4 carbon atoms, and q is 2 or 3, or

e. a mixture of the ligands cited under (a), (b), (c), and (d).

4,026,867

ACID MODIFIED PHENOL-ALDEHYDE RESINOUS CONDENSATION PRODUCTS AND FRICTION PARTICLES THEREFROM

Robert A. Gardiner, Maplewood, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

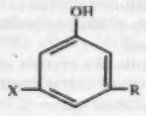
Continuation-in-part of Ser. No. 523,824, Nov. 14, 1974, abandoned. This application Apr. 16, 1976, Ser. No. 677,700

Int. Cl.² C08G *8/18*

U.S. Cl. 260—46 **7 Claims**

1. A resinous condensation product of (1) the ene reaction adduct of dienophilic alpha-beta-unsaturated aliphatic carboxylic acid or anhydride or ester thereof with unsaturated cashew nut shell liquid phenol or oligomer thereof and (2) aldehyde.

3. As a composition of matter, a resinous condensation product of aldehyde and phenol wherein the phenol comprises meta(carboxy-alkenyl)substituted phenol of the formula:



wherein R is a carboxy-alkenyl group containing at least one ethylenic double bond of the formula

$$-C_nH_{2n-x}(CO_2M)_m$$

where n is 17 to 21, m is an integer from 1 to $y+1$, x is an integer from 2 to 11 inclusive and is odd when m is even and even when m is odd, $x-m=y$, y is 1, 3 or 5, M is H or one equivalent of a polyvalent metal and X is H or OH;

or an oligomer of said phenol.

4,026,868

PROCESS FOR PRODUCING A LOW VISCOSITY SILICONE RESIN

Duane F. Merrill, Ballston Spa, N.Y., assignor to General Electric Company, Waterford, N.Y.

Filed Nov. 10, 1975, Ser. No. 630,848

Int. Cl.² C08G *77/04*

U.S. Cl. 260—46.5 R **8 Claims**

1. A process for producing a silicone resin which has a viscosity that does not exceed 100 centipoise at 140° C comprising:

A. adding with continuous agitation a mixture of acetone and organohalosilanes over a period of at least 40 minutes to a heterogeneous hydrolysis mixture having a water phase and an organic phase composed of water, acetone and a water-immiscible solvent wherein in the final heterogeneous hydrolysis mixture, per part by weight of organohalosilanes there is present;

1. from at least 1.7 parts to about 10 parts of water; l
2. from about 0.2 to about 5 parts of acetone;
3. from about 0.3 to about 5 parts of a water-immiscible organic solvent, and
4. from 0 to about one mole of an aliphatic monohydric alcohol having from 1 to 8 carbon atoms per mole of halogen attached to the silicone atom of said organohalosilane;

B. maintaining the temperature of said heterogeneous hydrolysis mixture below 45° C during step (A);

C. removing the water from said heterogeneous hydrolysis misture and reducing the acid content of the organic phase containing the formed silicone resin to below 5 parts per million; and

D. stripping off the solvent at a temperature not to exceed about 120° C to yield a polyorganosiloxane having an average ratio from about 1 to 1.8 organo radicals per silicon atom, said organohalosilanes in Step (A) being selected from the class consisting of

a. a mixture of organotrihalosilane and diorganodihalosilane,

b. a reaction product of an aliphatic monohydric alcohol having from 1 to 8 carbon atoms and a mixture of organotrihalosilane and diorganodihalosilane which reaction product may have up to one alkoxy radical substituted for each halogen radical in said organotrihalosilane and diorganodihalosilane;

c. a mixture of the reaction product of (a) and a member selected from the organotrihalosilane and diorganodihalosilane,

and where the organo radicals of said organohalosilanes are selected from the class consisting of monovalent hydrocarbon radicals and halogenated monovalent hydrocarbon radicals.

4,026,869

PHOTOCHROMIC POLYCONDENSATES

Georges Gerard Evens, Leuven, and Georges Joseph Smets, Heverlee, both of Belgium, assignors to AGFA-GEVAERT, N.V., Mortsel, Belgium

Division of Ser. No. 387,805, Aug. 13, 1973, Pat. No. 3,918,972. This application July 21, 1975, Ser. No. 597,635

Claims priority, application United Kingdom, Aug. 24, 1972, 39603/72

Int. Cl.² C08G *63/18*

U.S. Cl. 260—47 CZ **5 Claims**

1. Linear polyester polycondensate having recurring moieties of 2,2-bis(4-hydroxyphenol)-propane and a saturated dicarboxylic acid and having spiropyran photochromic groups integrally bonded within said polycondensate, said polycon-

densate having a glass transition temperature lower than 120° C. and possessing photochromic properties at or above said glass transition temperature.

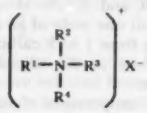
4,026,870

EXTRACTION OF COPPER CATALYST FROM POLYPHENYLENE OXIDE SOLUTIONS

Daniel Edwin Floryan, Glenmont, and Paul Caswell Fruscione, Albany, both of N.Y., assignors to General Electric Company, Pittsfield, Mass.

Filed Jan. 21, 1976, Ser. No. 650,987
Int. Cl.² C08G *65/44*
U.S. Cl. 260—47 ET **11 Claims**

1. In a process for the preparation of a high-molecular weight polyphenylene oxide having a degree of polymerization of at least 50 by oxidatively coupling a monovalent phenol having substitution in at least the two ortho positions and hydrogen or halogen in the para-position, using an oxygen-containing gas, and a complex copper-amine catalyst as the oxidizing agent, and extracting the copper catalyst with an aqueous solution of a salt of ethylenediaminetetraacetic acid, the improvement which comprises promoting the extraction efficiency of the salt of ehtylenediaminetetraacetic acid by employing in addition to said salt an effective amount of a quaternary ammonium salt of the formula:



wherein R^1, R^2, R^3 and R^4 are selected from the group consisting of alkyl, alkenyl and aralkyl radicals of from 1–24 carbon atoms and X is anion of an inorganic acid.

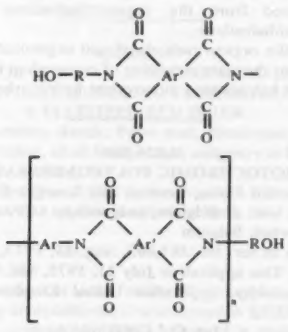
4,026,871

CHAIN-EXTENDING PHENOLIC END-CAPPED POLYIMIDES

Gaetano Francis D'Alelio, South Bend, Ind., assignor to University of Notre Dame, Notre Dame, Ind.

Division of Ser. No. 363,801, May 25, 1973, Pat. No. 3,897,395. This application Mar. 14, 1975, Ser. No. 558,451
Int. Cl.² C08G *73/10*
U.S. Cl. 260—49 **18 Claims**

1. A polymeric chain-extending process comprising: heating at a temperature in the range of about 150°–450° C a polyimide having the formula



wherein Ar' is a tetravalent aromatic organic radical, the four carbonyl groups being attached directly to separated carbon atoms and each pair of carbonyl groups being attached to adjacent carbon atoms in the Ar' radical, Ar is a divalent aromatic organic radical, R is an aromatic hydrocarbon radical of 6 to 12 carbon atoms, and *n* is a positive integer of at least one with a chain-extending material selected from the group consisting of formaldehyde, a compound capable of generating formaldehyde under the reaction conditions and hexamethylene tetramine in the presence of about 1–5% by weight, based on the weight of polyimide, of lime, and wherein the amount of formaldehyde present or generated is about 5–25% by weight, based on the weight of polyimide.

4,026,872

EPOXY RESIN COMPOSITIONS

Kenichi Saida, Hitachiota; Masahiko Sakai, Hitachi, and Toshikazu Narahara, Ibaraki, all of Japan, assignors to Hitachi, Ltd., Japan

Filed May 11, 1976, Ser. No. 685,532
Claims priority, application Japan, May 21, 1975, 50-59622
Int. Cl.² C08L *61/10, 63/02*
U.S. Cl. 260—59 R **6 Claims**

1. An epoxy resin composition comprising an alicyclic epoxy resin, a curing agent having phenolic hydroxyl group in its molecule and an imidazole accelerator, characterized in that said composition is obtained by blending 100 parts by weight of 2-(3,4-epoxy)cyclohexyl-5,5-spiro(3,4-epoxy)cyclohexane-m-dioxane as the alicyclic epoxy resin, 25 to 50 parts by weight of a phenol-formaldehyde condensate as the curing agent having phenolic hydroxyl group in its molecule and 0.1 to 15 parts by weight of at least one imidazole compound selected from the group consisting of 2-phenylimidazole, 2-undecylimidazole, 2-heptadecylimidazole, 2-phenyl-4-methylimidazole, 1-cyanoethyl-2-methylimidazole, 1-cyanoethyl-2-ethyl-4-methylimidazole, 1-cyanoethyl-2-methyl-4-ethylimidazole, 1-cyanoethyl-2-undecylimidazole, 1-cyanoethyl-2-phenylimidazole, 1-azine-2-methylimidazole, 1-azine-2-undecylimidazole and 1-azine-2-ethyl-4-methylimidazole as the imidazole curing accelerator.

4,026,873

NEEDLE-LIKE CRYSTALS OF POLYOXYMETHYLENE AND METHOD FOR MANUFACTURE THEREOF

Masatoshi Iguchi, Yamato, Japan, assignor to Agency of Industrial Science & Technology, Tokyo, Japan

Continuation-in-part of Ser. No. 454,924, March 26, 1974, abandoned. This application Dec. 17, 1975, Ser. No. 641,762
Claims priority, application Japan, Apr. 21, 1973, 48-45616
Int. Cl.² C08G *2/10;* **C07D** *323/06*
U.S. Cl. 260—67 FP **7 Claims**

1. A method of producing needle-like crystals of polyoxymethylene having a hexagonal cross-section comprising:

dissolving purified trioxane monomer in an anhydrous nonpolar solvent and maintaining the resultant solution at a constant temperature between 30° and 65° C;

adding one member of the group comprising boron trifluoride and its ether complex derivatives to said solution in an amount of between 2×10^{-4} and 1×10^{-2} mol/l thereafter adding water in an amount of between 1×10^{-5} and 2.5×10^{-4} mol/l so that the molar ratio of BF_3 to H_2O is not less than 20 and homogenizing the mixture after each addition;

maintaining the mixture unstirred at the said constant temperature, whereby producing needle-like crystals of polyoxymethylene; and

separating said needle-like crystals as the product.

6. Needle-like crystals of polyoxymethylene having a hexagonal cross section obtained by:

dissolving purified trioxane monomer in an anhydrous nonpolar solvent and maintaining the resultant solution at a constant temperature between 30° and 65° C;

adding one member of the group comprising boron trifluoride and its ether complex derivatives to said solution in an amount of between 2×10^{-4} and 1×10^{-2} mol/l thereafter adding water in an amount of between 1×10^{-5} and

2.5×10^{-4} mol/l so that the molar ratio of BF_3 to H_2O is not less than 20 and homogenizing the mixture after each addition;

maintaining the mixture unstirred at the said constant temperature, whereby producing needle-like crystals of polyoxymethylene; and

separating said needle-like crystals as the product.

4,026,874

SCALE CONTROL

Thomas E. Sample, Jr.; James W. Hughes, and Jack F. Tate, all of Houston, Tex., assignors to Texaco Inc., New York, N.Y.

Division of Ser. No. 296,399, Oct. 10, 1972, Pat. No. 3,925,582, which is a continuation-in-part of Ser. No. 141,892, May 10, 1971, abandoned. This application June 25, 1975, Ser. No. 590,001

Int. Cl.² C08G *18/12, 18/06*

U.S. Cl. 260—77.5 MA **11 Claims**

1. A process of preparing novel, partially cured polyurethane resins for imparting scale-resistant properties to substrate surfaces normally susceptible to mineral scale formation while in contact with mineralized water containing less than about 5 percent hydrocarbons and wherein any heat flow is from the substrate surface into the mineralized water comprising the steps of:

a. admixing at least one aromatic polyisocyanate with a stoichiometric excess of polyol component, at least a portion of which is composed of polyoxyalkylated polyols having a functionality of three or greater, each of the polyoxyalkylene chains of said polyols containing an average of 3 to 50 oxyalkylene groups, and monohydric polyethers having the structural formula

$$R\text{-}OCH_2\text{-}CHR'\text{-}O_nH$$

wherein R is alkyl, aryl or other radical which is non-reactive with isocyanate functional groups, R′ is alkyl and *n* is an integer from about 3 to about 50 the remainder of said polyol component consisting of conventional polyols, and

b. partially heat curing said polyurethane resin mixture containing pendant polyoxyalkylene chains at temperatures and times sufficient to produce enough crosslinking to provide polymeric networks without substantially setting the resins to such an extent as to preclude their being applied by conventional means as coatings or being formed into fabricated articles of commerce, and without substantially altering the integrity of the pendant polyoxyalkylene chains.

4,026,875

METHOD FOR DEACTIVATING THE CATALYST IN A POLYURETHANE PREPOLYMER

Gerhard Leu, Schlieren; Ueli Sulser, Oberengstringen; Jurg Widmer, Zurich, and Heinz Goeth, Bulach, all of Switzerland, assignors to Sika AG, vormals Kaspar Winkler & Co., Zurich, Switzerland

Filed Apr. 7, 1976, Ser. No. 674,408

Claims priority, application Austria, Apr. 15, 1975, 2846/75

Int. Cl.² C08G *18/82, 18/10;* C08K *5/02*

U.S. Cl. 260—77.5 A **5 Claims**

1. In a method for manufacturing polyurethane prepolymers with free, reactive end groups prepared from polyisocyanates and compounds with active H-atoms in the presence of a tertiary amine as the catalyst, which prepolymers without further treatment tend to increase in viscosity on aging, the improvement comprising deactivating the catalyst by mixing an effective amount of tetrabromo ethane with the prepolymer, whereby the tendency of the prepolymer to increase in viscosity on aging is substantially reduced.

4,026,876

SOLUBLE POLYAMIDE-IMIDES DERIVED FROM PHENYLINDANE DIAMINES

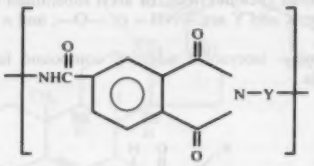
John H. Bateman, Bardonia, and David A. Gordon, Scarsdale, both of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 542,144, Jan. 20, 1975, Pat. No. 3,983,092. This application Sept. 15, 1975, Ser. No. 613,131

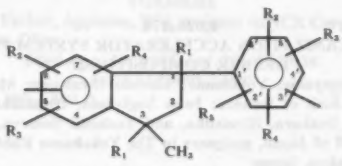
Int. Cl.² C08G *73/14*

U.S. Cl. 260—78 TF **16 Claims**

1. A soluble polyamide-imide consisting essentially of the recurring unit having the formula



wherein Y is a divalent organic radical selected from carbocyclic-aromatic, aliphatic, araliphatic, cycloaliphatic, and heterocyclic radicals, combinations of these, and radicals with heteroatom-containing bridging groups where the heteroatom in the bridge is oxygen, sulfur, nitrogen, silicon or phosphorus, provided that, out of the total number of polyamide-imide recurring units, 1 to 100 percent of such units have Y equal to a phenylindane radical of the structural formula



wherein

R_1 is hydrogen or lower alkyl and

R_2, R_3, R_4 and R_5 are independently hydrogen, halogen or lower alkyl, and either aromatic ring of the unsymmetrical phenylindane radical may be bonded to an amide or imide nitrogen.

4,026,877

VULCANIZATION ACCELERATOR SYSTEM FOR RUBBER COMPOSITIONS

Kunio Kageyama, Yokohama; Hiroshi Hirakawa; Masatake Ozaki, both of Isehara; Iwao Sugiyama, Hiratsuka; Mitsuharu Iwakura, Hiratsuka, and Yoshiaki Someya, Hiratsuka, all of Japan, assignors to The Yokohama Rubber Co. Ltd., Tokyo, Japan

Filed Oct. 24, 1975, Ser. No. 625,568

Claims priority, application Japan, Oct. 30, 1974, 49-124433

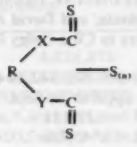
Int. Cl.² C08L *7/00, 9/00;* C09K *3/00*

U.S. Cl. 260—79.5 P **22 Claims**

2. A vulcanizable rubber composition comprising:

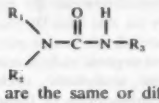
1. a rubber containing an olefinically unsaturated group;

2. at least one compound as a source of carbon disulfide selected from cyclic sulfides having the formula:



wherein R is a divalent hydrocarbon radical selected from the group consisting of alkylene, alkenylene, phenylene, alkyl substituted phenylene, halogen substituted phenylene, xylylene, alkyl substituted xylylene, halogen substituted xylylene, cyclohexylene, cyclohexylidene, alkyl substituted cyclohexylene, or alkyl substituted cyclohexylidene; X and Y are —NH— or —O—; and *n* is 1 or 2; and

3. an amine- isocyanate addition compound having the formula:



in which R_1 and R_2 are the same or different mono-valent hydrocarbon radicals having 1 to 8 carbon atoms; or together with the nitrogen atom, a non-acidic heterocyclic ring, containing at least one atom selected from oxygen, sulphur and nitrogen; and R_3 represents a substituted or unsubstituted aryl or alkyl radical having from 4 to 18 carbon atoms.

4,026,878

VULCANIZATION ACCELERATOR SYSTEM FOR RUBBER COMPOSITIONS

Kunio Kageyama, Yokohama; Hiroshi Hirakawa; Masatake Ozaki, both of Isehara; Iwao Sugiyama, Hiratsuka; Mitsuharu Iwakura, Hiratsuka, and Yoshiaki Someya, Hiratsuka, all of Japan, assignors to The Yokohama Rubber Co. Ltd., Tokyo, Japan

Filed Oct. 24, 1975, Ser. No. 625,569

Claims priority, application Japan, Oct. 25, 1974, 49-122602

Int. Cl.[2] C08L *7/00, 9/00;* **C09K** *3/00*

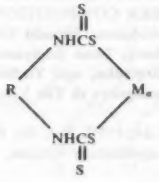
U.S. Cl. 260—79.5 P **25 Claims**

2. A vulcanizable rubber composition comprising:

A. a rubber containing an olefinically unsaturated group;

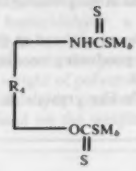
B. at least one compound as a source of carbon disulfide selected from the group consisting of:

1. cyclic bis (dithiocarbamic acid) metal salts having the general formula:



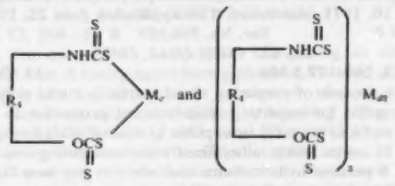
in which R represents a di-valent cycloaliphatic or aromatic radical and M_a represents a di-valent metal atom,

2. non-cyclic dithiocarbamic-xanthogenic acid metal salts having the formula:



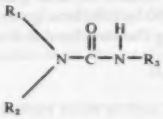
wherein M_b is a mono-valent metal atom and R_4 is a di-valent aliphatic radical, and

3. cyclic dithiocarbamic-xanthogenic acid metal salts having the formulas:



wherein M_c is a divalent and M_d is a trivalent metal atom and R_4 is a di-valent aliphatic radical; and

C. an amine-isocyanate addition compound having the formula:



in which R_1 and R_2 are the same or different mono-valent hydrocarbon radicals having 1 to 8 carbon atoms; or together with the nitrogen atom, a non-acidic heterocyclic ring, containing at least one atom selected from oxygen, sulphur and nitrogen; and R_3 represents a substituted or unsubstituted aryl or alkyl radical having 4 to 18 carbon atoms.

4,026,879

ANTIGEN-CONTAINING PROPRANOLOL DERIVATIVES

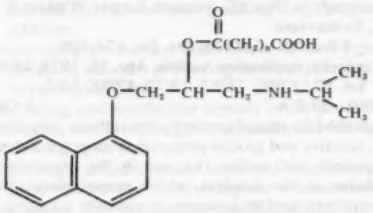
Sidney Spector, Livingston, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Mar. 23, 1976, Ser. No. 669,784

Int. Cl.[2] C07G *7/00*

U.S. Cl. 260—121 **4 Claims**

1. An antigen consisting essentially of a propranolol hapten of the formula



wherein *n* is an integer from 2 to 6;

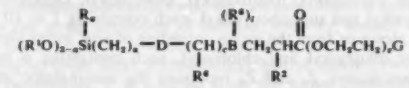
said hapten being convalently bonded to an immunogenic carrier material through the carboxyl group.

4,026,880
SILANES HAVING AN AMINE FUNCTIONAL GROUP THEREON

Tyrone D. Mitchell, Rensselaer, N.Y., assignor to General Electric Company, Waterford, N.Y.

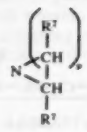
Filed Aug. 5, 1971, Ser. No. 169,481
Int. Cl.² C07D 203/10
U.S. Cl. 260—239 E 3 Claims

1. A silicone compound of the formula,



where R is selected from the class consisting of monovalent hydrocarbon radicals and halogenated monovalent hydrocarbon radicals and R^1 is an alkyl radical of up to 10 carbon atoms, R^2 and R^6 are selected from the class consisting of hydrogen, alkyl and aryl radicals of up to 10 carbon atoms, B is selected from the class consisting of nitrogen, sulfur and oxygen, D is selected from the group consisting of

and oxygen, G is selected from the class consisting of



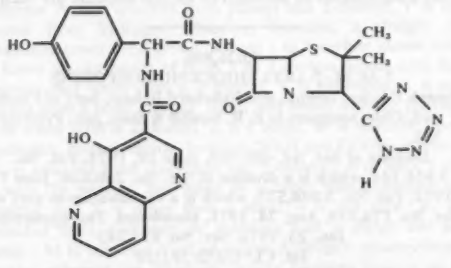
and $N(R^7)_2$, where R^7 is selected from the class consisting of hydrogen and alkyl radicals of up to 10 carbon atoms, *n* is a whole number from 1 to 10, *c* is a whole number from 1 to 10, *v* is a whole number that varies from 1 to 5, *p* is a whole number that varies from 1 to 6, *t* is a whole number that varies from 0 to 1 and *a* is a whole number that varies from 0 to 2.

4,026,881
6-(D-2-[4-HYDROXY-1,5-NAPHTHYRIDINE-3-CARBOXAMIDO]-2-[4-HYDROXYPHENYL]ACETAMIDO)-2,2-DIMETHYL-3-(5-TETRAZOLYL)PENAM

Wayne E. Barth, East Lyme, Conn., assignor to Pfizer Inc., New York, N.Y.

Filed Apr. 16, 1976, Ser. No. 677,725
Int. Cl.² C07D 499/28, 499/00, 499/70
U.S. Cl. 260—239.1 4 Claims

1. The compound of the formula



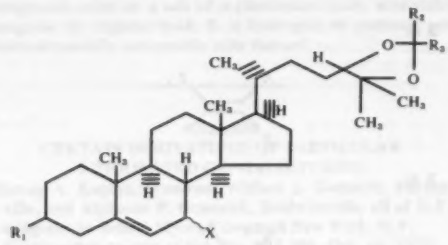
and the pharmaceutically-acceptable base salts thereof.

4,026,882
SYNTHESES OF 3,24R,25- AND 3,24S,25-TRIHYDROXY-5,7-CHOLESTADIENE 24,25-KETALS AND ALKANOYL DERIVATIVES THEREOF

Enrico Baggiolini, Nutley; John Joseph Partridge, Jr., and Milan Radoje Uskokovic, both of Upper Montclair, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Mar. 8, 1976, Ser. No. 664,848
Int. Cl.² C07J 71/00
U.S. Cl. 260—239.55 D 25 Claims

1. A compound of the formula



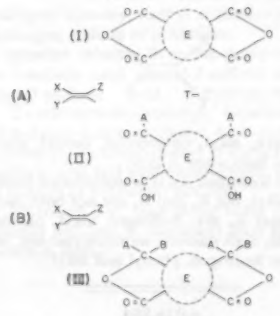
wherein

R_1 is hydroxy or lower alkanoyloxy, R_2 and R_3 each independently are lower alkyl, R_2 and R_3 taken together are lower alkylene, X is bromo or chloro and the absolute configuration at C-24 is R or S.

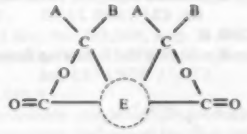
4,026,883
DERIVATIVES OF DIANHYDRIDES AS VINYL COLOR FORMERS

Sheldon Farber, Appleton, Wis., assignor to NCR Corporation, Dayton, Ohio

Filed Apr. 10, 1975, Ser. No. 567,024
Int. Cl.² C09B 23/00
U.S. Cl. 260—240 D 12 Claims

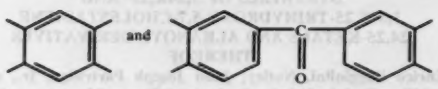


1. A compound having at least two vinyl linkages and represented by the formula:

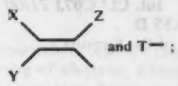


Wherein

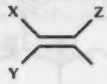
E is:



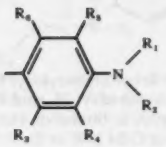
A is:



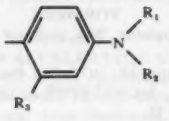
B is:



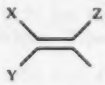
X is:



Y is: X and hydrogen;
T is:



Z is: hydrogen, and methyl when A is



and hydrogen, alkyl, carbalkoxy, benzyl, unsubstituted phenyl, and halo when A is T;
R_1 and R_2 are: hydrogen, alkyl, unsubstituted phenyl, benzyl and cycloalkyl; but R_1 and R_2 are not both phenyl;
R_3, R_4, R_5, and R_6 are: hydrogen, alkyl, phenyl, benzyl, alkoxy, halo, dialkylamino, monoalkylamino, amino; and
R_7 and R_8 are: hydrogen, phenyl and alkyl.

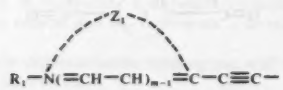
4,026,884

METHYNE DYES AND PHOTOGRAPHIC ELEMENTS

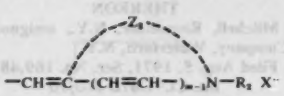
John David Mee, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 375,974, July 2, 1973, abandoned. This application Apr. 14, 1975, Ser. No. 567,916
Int. Cl.² C09B *23/00*
U.S. Cl. 260—240 R **6 Claims**

1. A methyne dye having the following formula:



-continued



wherein m is a positive integer of from 1 to 3; R_1 and R_2 each are independently selected from the group consisting of alkyl, lower alkoxyalkyl, hydroxyalkyl, phenylalkyl, carboxyalkyl, sulfoalkyl and sulfophenylalkyl, each containing 1 to 10 carbon atoms or from the group consisting of aryl, lower alkaryl, lower alkoxyaryl and chloroaryl, each containing 6 to 20 carbon atoms; Z_1 and Z_2 represent the non-metallic atoms required to complete a heterocyclic nucleus of the type used in cyanine dyes and X^- is an acid anion.

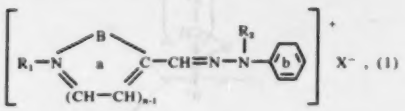
4,026,885

PROCESS FOR THE MANUFACTURE OF CATIONIC HYDRAZONE DYES

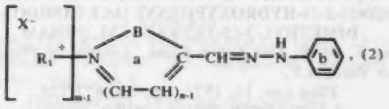
Christian Frey, Muttenz, and Peter Moser, Binningen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Apr. 27, 1976, Ser. No. 680,638
Claims priority, application Switzerland, May 13, 1975, 6114/75; Apr. 7, 1976, 4363/76
Int. Cl.² C09B *55/00*; **C07D** *211/72, 215/06*
U.S. Cl. 260—240 G **8 Claims**

1. A process for the manufacture of dyes of the formula



wherein each of R_1 and R_2 represents a methyl or ethyl radical, n is 1 or 2, X^- is the charge equivalent of an anion and B represents a divalent radical which completes the ring a to form a pyridinium or quinolinium ring which is unsubstituted or substituted by chlorine or methyl, and the ring b is unsubstituted or substituted by low molecular alkyl or alkoxy or by halogen, which process comprises treating a compound of the formula



wherein R_1, n, X^-, B, a and b are as defined in formula (1) and m is 1 or 2, in aqueous medium at a pH of 12 or above, with dimethyl or diethyl sulphate, with the proviso that if $m = 1$, at least 2 equivalents of dimethyl or diethyl sulphate are used.

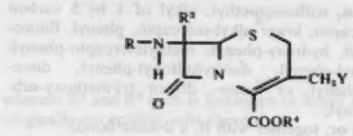
4,026,886

7-ACYL-7-ARYLTHIOCEPHALOSPORINS

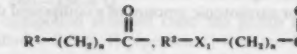
Joseph Edward Dolfini, and Ekkehard Bohme, both of Cincinnati, Ohio, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 480,789, June 19, 1974, Pat. No. 3,954,744, which is a division of Ser. No. 260,620, June 7, 1972, Pat. No. 3,840,533, which is a continuation-in-part of Ser. No. 174,510, Aug. 24, 1971, abandoned. This application Jan. 23, 1976, Ser. No. 651,742
Int. Cl.² C07D *501/20*
U.S. Cl. 260—243 C **9 Claims**

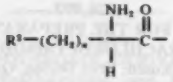
1. A compound of the formula:



wherein R^3 is selected from the group consisting of phenylthio and substituted phenylthio wherein said substituent is selected from the group consisting of halogen, hydroxy, amino, nitro and lower alkyl; R^4 is selected from the group consisting of hydrogen, lower alkyl, trichloroethyl, benzyl, methoxybenzyl, and benzhydryl; Y is selected from the group consisting of hydrogen, acetoxy, pyridinium, and hydroxy; and R is selected from the group consisting of



and



wherein *n* is zero or one, X_1 is O or S, and R^2 is selected from the group consisting of thienyl, phenyl, and mono and disubstituted phenyl and thienyl wherein said substituents are selected from the group consisting of chloro, bromo, nitro, lower alkyl, and lower alkoxy; and pharmaceutically acceptable salts thereof.

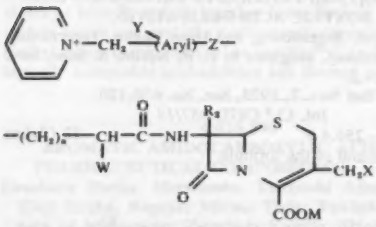
4,026,887

CEPHALOSPORIN ANTIBIOTICS

Fortuna Haviv, Montreal, Canada, and Abraham Patchornik, Ness-Ziona, Israel, assignors to Yeda Research & Development Co. Ltd., Rehovot, Israel

Filed Oct. 24, 1975, Ser. No. 625,570
Int. Cl.² C07D *501/22, 501/30, 501/32*
U.S. Cl. 260—243 C **32 Claims**

1. A compound selected from a base of the formula:



wherein Aryl is selected from phenyl and 2-thienyl; Y is selected from hydrogen, chlorine, bromine, a straight or branched lower alkyl group of from 1 to 4 carbon atoms, and a lower alkoxy group of from 1 to 4 carbon atoms with the proviso that when Aryl is 2-thienyl, Y is hydrogen; Z is selected from a bond, oxygen, sulfur and imino with the proviso that when Aryl is 2-thienyl, Z is a bond; W is selected from hydrogen, methyl, amino, hydroxy, SO_3H and $COOR_1$ wherein R_1 is selected from hydrogen and 5-indanyl; *n* is zero, 1 or 2 with the proviso that when W is other than hydrogen or methyl, and Z is other than a bond, *n* is not zero; R_2 is selected from hydrogen or methoxy and is either cis- or trans-; M is selected from an anion; hydrogen alkanoyloxymethyl wherein the alkanoyl moiety contains from 1 to 5 carbon atoms and may be straight or branched; alkanoylaminomethyl wherein the alkanoyl moiety contains from 1 to 5 carbon atoms and may be straight or branched and wherein the amino nitrogen may be substituted with an alkyl group of from 1 to 4 carbon atoms; alkoxycarbonylaminomethyl wherein the alkoxy moiety contains from 1 to 4 carbon atoms and may be straight or branched and wherein the amino nitrogen atom may be substituted with an alkyl group of from 1 to 4 carbon atoms; p-(alkanoyloxy)benzyl wherein the alkanoyl moiety contains from 1 to 5 carbon atoms and may be straight or branched; or aminoalkanoyloxymetyl wherein the alkanoyl moiety contains from 2 to 15 carbon atoms, and the amino nitrogen atom may be mono- or di-substituted with a lower alkyl group of from 1 to 4 carbon atoms; with the proviso that when M is other than an anion the compound exists as a salt of a pharmaceutically acceptable inorganic or organic acid; X is hydrogen or acetoxy; and pharmaceutically acceptable salts thereof.

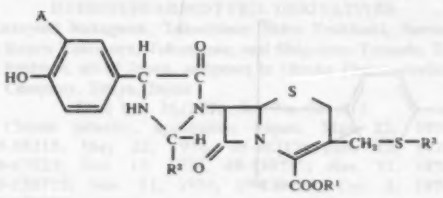
4,026,888

CERTAIN DERIVATIVES OF PARTICULAR 3-THIOLATED CEPHALOSPORINS

Murray A. Kaplan, Syracuse; William J. Gottstein, Fayetteville, and Alphonse P. Granatek, Baldwinsville, all of N.Y., assignors to Bristol-Myers Company, New York, N.Y.

Continuation-in-part of Ser. No. 622,306, Oct. 10, 1975, abandoned. This application Jan. 30, 1976, Ser. No. 653,999
Int. Cl.² C07D *501/20*
U.S. Cl. 260—243 C **59 Claims**

1. A compound of the formula



wherein

A is hydrogen, hydroxy, methyl or methoxy,

R^1 is hydrogen, sodium or potassium,

R^2 is a member selected from the group consisting of 2-furan-5-sulfonic acid, phenyl-2-sulfonic acid, 4-methoxyphenyl-3-sulfonic acid, 4-hydroxyphenyl-3-sulfonic acid, 2-carboxymethoxyphenyl, 4-carboxymethoxyphenyl, 3-hydroxy-4-carboxyphenyl, 4-(2′-carboxy)vinylphenyl, carboxyl, 2-carboxyphenyl, 3-carboxyphenyl, methanesulfonic acid and methanedisulfonic acid in the form of its sodium or potassium salt, and

R^3 is, 1,2,3-triazol-5-yl, such group being unsubstituted or substituted with one or two lower alkyl groups of one to four carbon atoms.

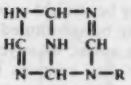
4,026,889

PHOSPHORUS-CONTAINING CONDENSATION PRODUCTS

Hermann Nachbur, Dornach, and Arthur Maeder, Therwil, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 285,169, Aug. 31, 1972, abandoned. This application Oct. 21, 1975, Ser. No. 624,630
Int. Cl.² C07D *251/72*
U.S. Cl. 260—249.9 **10 Claims**

1. The water-soluble condensation products produced by the process, comprising the step of reacting and condensing a tetrakis-(hydroxymethyl)-phosphonium salt or hydroxide with a 2,4,6,8,9-pentaazo-bicyclo-nona-2,6-diene of the formula



or a salt thereof, wherein R is hydrogen, hydroxyl, lower alkyl, lower alkenyl, cyclohexyl, lower hydroxyalkyl, di(lower alkyl-)amino-lower alkyl, phenyl, hydroxyphenyl, N-morpholyl-lower alkyl, pyridyl, pyrimidyl or piperazine-lower alkyl, at a temperature in the range of 40° to 120° C, and in a molar ratio of 1:0.02 to 1:1.

4,026,890

TRIAZINE-UREA GREASE THICKENERS

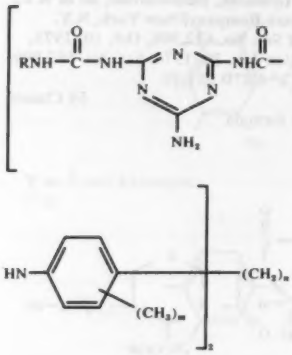
Thomas F. Wulfers, Hazelcrest, Ill., assignor to Shell Oil Company, Houston, Tex.

Filed Nov. 26, 1975, Ser. No. 635,532

Int. Cl.² C07D *251/70*

U.S. Cl. 260—249.6 **14 Claims**

1. A triazine-urea compound defined by the formula:



wherein R is an aliphatic hydrocarbyl radical of 16 to 22 carbon atoms and *m* and *n* are integers of 0–1.

4,026,891

5- OR 6-PYRIDAZINYL-BENZIMIDAZOLES AND SALTS THEREOF

Volkhard Austel; Eberhard Kutter, both of Biberach an der Riss; Joachim Heider, Warthausen-Oberhofen; Wolfgang Eberlein, Biberach-Mettenberg; Rudolf Kadatz, Biberach an der Riss, and Willi Diederen, Rissegg, all of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

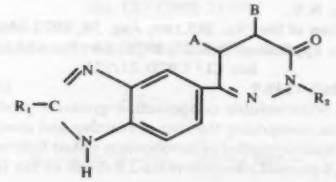
Filed June 4, 1975, Ser. No. 583,641

Claims priority, application Germany, June 10, 1974, 2427943; Apr. 12, 1975, 2516040

Int. Cl.² C07D *403/04*

U.S. Cl. 260—250 AH **11 Claims**

1. A compound of the formula



wherein

R_1 is hydrogen, trifluoromethyl, alkyl of 1 to 5 carbon atoms, mercapto, lower alkyl-mercapto, phenyl, fluorophenyl, tolyl, hydroxy-phenyl, methylmercapto-phenyl, methylsulfinyl-phenyl, methylsulfonyl-phenyl, dimethylamino-phenyl, or mono-, di- or tri-methoxy-substituted phenyl;

A is hydrogen or, together with B, a double bond;

B is hydrogen, alkyl of 1 to 3 carbon atoms, or together with A, a double bond; and

R_2 is hydrogen or alkyl of 1 to 3 carbon atoms;

or a non-toxic, pharmacologically acceptable acid addition salt thereof.

11. The method of lowering the blood pressure, inhibiting thrombocyte aggregation or increasing the force of contraction of the heart muscle in a warm-blooded animal in need of such treatment, which comprises perorally, parenterally or rectally administering to said animal an effective hypotensive, antithrombotic or cardiotonic amount of a compound of claim 1.

4,026,892

PROCESS FOR THE PREPARATION OF TETRACHLOROPYRIMIDINE

Gunther Beck, Leverkusen; Fritz Döring, Odenthal-Gloebusch, and Hans Holtschmidt, Bergisch-Gladbach, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Oct. 28, 1975, Ser. No. 626,414

Claims priority, application Germany, Oct. 30, 1974, 2451630

Int. Cl.² C07D *239/20*

U.S. Cl. 260—251 R **7 Claims**

1. Process for the preparation of tetrachloropyrimidine, characterised in that 2-cyano-1,2-(dichlorovinyl)-isocyanide-dichloride of the formula

$$NC - CCl = CCl - N = CCl_2$$

is reacted with Friedel-Crafts compounds at a temperature of 150° to 250° C.

4,026,893

PYRAZOLO[1,5-a]PYRIDO[3,2-e]PYRIMIDINE-7-CARBOXYLIC ACID DERIVATIVES

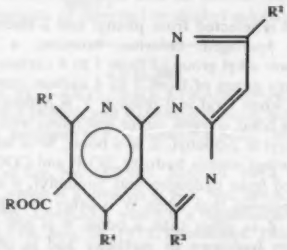
Theodor Denzel, Regensburg, and Hans Hoehn, Tegernheim, both of Germany, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Nov. 7, 1975, Ser. No. 630,120

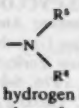
Int. Cl.² C07D *487/14*

U.S. Cl. 260—256.4 F **12 Claims**

1. A compound of the formula



wherein R, R^1 and R^3 each is hydrogen or lower alkyl; R^2 is hydrogen, lower alkyl or phenyl; R^4 is hydroxy, halogen, lower alkoxy, or the group



wherein R^5 and R^6 each is hydrogen or lower alkyl; and physiologically acceptable salts thereof.

4,026,894

ANTIHYPERTENSIVE AGENTS

Martin Winn, Deerfield; Jaroslav Kyncl, Lake Bluff; Daniel Ambrose Dunnigan, Winthrop Harbor, and Pete. Hadley Jones, Lake Forest, all of Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Filed Oct. 14, 1975, Ser. No. 621,980

Int. Cl.² C07D *239/84*

U.S. Cl. 260—256.4 Q **3 Claims**

1. A compound selected from the group consisting of 2-[4(tetrahydro-2-furoyl)-piperazino]-4-amino-6,7-dimethoxyquinazoline and 2-[4(tetrahydropyran-2-carbonyl)-piperazinyl]-4-amino-6,7-dimethoxyquinazoline and pharmaceutically acceptable acid addition salts thereof.

4,026,895

1,3-BENZODIOXOL DERIVATIVES

Satoru Tanaka, Higashikurume, and Hideaki Watanabe, Ushiku, both of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan

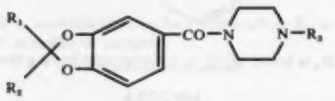
Division of Ser. No. 503,515, Sept. 5, 1974, Pat. No. 3,981,864. This application Aug. 29, 1975, Ser. No. 609,145

Claims priority, application Japan, Sept. 8, 1973, 48-100761; Sept. 8, 1973, 48-100762

Int. Cl.² C07D *405/10*

U.S. Cl. 260—268 TR **6 Claims**

1. A member of the group consisting of a compound of the formula:



wherein R_1 and R_2 are respectively lower alkyl of 1 to 2 carbon atoms or both R_1 and R_2 together form divalent alkylene of 5 carbon atoms as a part of a cyclic structural moiety; and R_3 is methyl, phenyl, chlorophenyl or benzhydryl; and a pharmacologically acceptable acid-addition salt thereof.

4,026,896

AROMATIC AMIDOCARBOXYLIC ACIDS AND PHARMACEUTICAL COMPOSITIONS THEREOF

Kozaburo Harita, Matsumoto; Yukiyoshi Ajisawa, Okaya; Kinji Iizuka, Nagoya; Michio Toda; Yukihiko Kinoshita, both of Matsumoto; Tetsuhide Kamijo, Shiojiri, and Michihiro Kobayashi, Matsumoto, all of Japan, assignors to Kissei Yakuhin Kogyo Kabushiki Kaisha (Kissei Pharmaceutical Co. Ltd.), Nagano, Japan

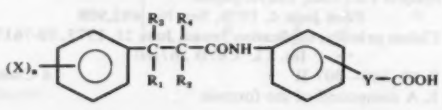
Filed Apr. 16, 1975, Ser. No. 568,423

Claims priority, application Japan, Apr. 18, 1974, 49-43675; Apr. 18, 1974, 49-43676; Apr. 18, 1974, 49-43678

Int. Cl.² C07C *103/84*

U.S. Cl. 424—282 **7 Claims**

1. Compounds of the general formula:



wherein R_1 and R_2 each represent a hydrogen atom or an alkyl group with 1–4 carbon atoms; R_3 and R_4 each represent a hydrogen atom or may be combined together to form another chemical bond; X represents a hydroxyl group, a halogen atom, a straight or branched chain saturated or unsaturated alkyl group with 1–4 carbon atoms, a straight or branched chain saturated or unsaturated alkoxy group with 1–4 carbon atoms, an acyloxy group with 1–4 carbon atoms, or a cycloalkyl group with up to 6 carbon atoms; n is zero or an integer of 1–3 with the proviso that when n is 2 or 3, X's may be same or different and that when two X's are commonly said alkyl or alkoxy group, both X's may be combined together to form a ring; and Y represents a straight or branched chain alkylene group or a straight or branched chain oxyalkylene group connected to the benzene ring through the oxygen atom, as well as physiologically acceptable salts thereof.

7. A Pharmaceutical composition which comprises a pharmaceutically effective amount of compound as claimed in claim 1 and an inert, non-toxic pharmaceutically acceptable carrier.

4,026,897

5-[1-HYDROXY-2-(SUBSTITUTED-AMINO)]ALKYL-8-HYDROXYCARBOSTYRIL DERIVATIVES

Kazuyuki Nakagawa, Tokushima; Shiro Yoshizaki, Naruto; Kaoru Tanimura, Tokushima, and Shigeharu Tamada, Tokushima, all of Japan, assignors to Otsuka Pharmaceutical Company, Tokyo, Japan

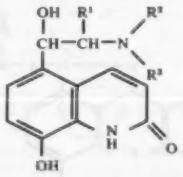
Filed Dec. 26, 1974, Ser. No. 536,515

Claims priority, application Japan, May 22, 1974, 49-58315; May 22, 1974, 49-58317; June 13, 1974, 49-67823; Nov. 11, 1974, 49-130717; Nov. 11, 1974, 49-130718; Nov. 11, 1974, 49-130727; Dec. 4, 1974, 49-140339

Int. Cl.² C07D *215/26, 215/22*

U.S. Cl. 260—288 R **8 Claims**

1. A 5-[1-hydroxy-2-(substituted-amino)]alkyl-8-hydroxycarbostyril compound represented by the formula (I)



(I)

wherein R^1 represents an alkyl group having 1 to 4 carbon atoms and R^2 and R^3, which may be the same or different, each represents a hydrogen atom, an alkyl group having 1 to 4 carbon atoms, a phenylalkyl group having a straight or branched chain alkyl moiety having 1 to 4 carbon atoms or a cycloalkyl group having 4 to 6 carbon atoms, or R^2 and R^3 may, when taken together with the nitrogen atom to which they are attached, form a 5- or 6- membered heterocyclic ring, substituted by an alkyl group having 1–4 carbon atoms or unsubstituted selected from the group consisting of pyrrolidino, piperidino, morpholino and piperazino and the pharmaceutically acceptable acid addition salts thereof.

4,026,898

7-OXO-1,2,3,3,8-PENTAMETHYL-5-TRIFLUOROMETHYL-2,3,7,8-TETRAHYDRO-1-H-PYRROLO[3,2-g] QUINOLINE, A STABLE, EFFICIENT LASER DYE

Ronald A. Henry, China Lake; Peter R. Hammond, Livermore; Erhard J. Schimitschek, San Diego, and John A. Trias, La Mesa, all of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 4, 1976, Ser. No. 663,887
Int. Cl.² C07D *471/04*
U.S. Cl. 260—288 CF **3 Claims**

1. 7-Oxo-1,2,3,3,8-pentamethyl-5-trifluoromethyl-2,3,7,8-tetrahydro-1-H-pyrrolo [3,2-g] quinoline.

2. 7-Oxo-1,2,3,3-tetramethyl-5-trifluoromethyl-2,3,7,8-tetrahydro-1-H-pyrrolo [3,2-g] quinoline.

3. A method for preparing 7-oxo-1,2,3,3,8-pentamethyl-5-trifluoromethyl-2,3,7,8-tetrahydro-1-H-pyrrolo [3,2-g] quinoline comprising the steps of:

a. hydrogenating under pressure 1,3,3-trimethyl-2-methylindoline with a 10% palladium on charcoal catalyst whereupon the catalyst is removed leaving a liquid;

b. forming a reaction mixture by adding with cooling and stirring to said liquid nitric acid and sulfuric acid, whereupon the reaction mixture is neutralized to obtain 6-nitro-1,2,3,3-tetramethylindoline;

c. reducing said 6-nitro-1,2,3,3-tetramethylindoline to the corresponding 6-amino-1,2,3,3-tetramethylindoline;

d. reacting then refluxing said 6-amino-1,2,3-tetramethylindoline with ethyl trifluoroacetoacetate to yield 7-Oxo-1,2,3,3-tetramethyl-5-trifluoromethyl-2,3,7,8-tetrahydro-1-H-pyrrolo [3,2-g] quinoline; and

e. refluxing said 7-oxo-1,2,3,3-tetramethyl-5-trifluoromethyl-2,3,7,8-tetrahydro-1H-pyrrolo [3,2-g] quinoline with trimethyl phosphate to yield 7-oxo-1,2,3,3,8-pentamethyl-5-trifluoromethyl-2,3,7,8-tetrahydro-1H-pyrrolo [3,2-g] quinoline.

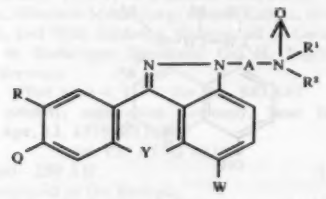
4,026,899

BENZO AND BENZOTHIOPYRANOINDAZOLE N-OXIDES

Edward Faith Elslager, Ann Arbor, Mich., assignor to Parke, Davis & Company, Detroit, Mich.

Division of Ser. No. 507,634, Sept. 20, 1974, Pat. No. 3,963,740, which is a continuation-in-part of Ser. No. 379,779, July 16, 1973, abandoned. This application Mar. 26, 1976, Ser. No. 670,762
Int. Cl.² C07D *495/06*
U.S. Cl. 260—293.57 **3 Claims**

1. A compound of the formula



and acid addition salts thereof; wherein:

A is an alkylene radical containing 2 to 4 carbon atoms;

R^1 and R^2 taken together are a lower alkylene radical containing 4 to 8 carbon atoms, 4 to 6 of which are joined in a ring with the nitrogen atom;

W is methyl, hydroxymethyl or hydrocarbon acyloxymethyl wherein said acyl fragment contains from one to eight carbon atoms,

Y is sulfur or oxygen; and

one of Q and R is hydrogen and the other is hydrogen, halo or alkoxy having from one to four carbon atoms.

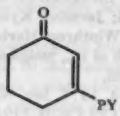
4,026,900

3-(PYRIDINYL)-2-CYCLOHEXEN-1-ONES

Karl O. Gelotte, East Nassau; Andrew W. Zalay, Albany, and Malcolm R. Bell, East Greenbush, all of N.Y., assignors to Sterling Drug Inc., New York, N.Y.

Filed Mar. 19, 1976, Ser. No. 668,451
Int. Cl.² C07D *213/350*
U.S. Cl. 260—296 M **6 Claims**

1. A 3-(pyridinyl)-2-cyclohexen-1-one having the formula



where PY is 4- or 3-pyridinyl or 4- or 3-pyridinyl having one or two lower-alkyl substituents, or its oxime derivative.

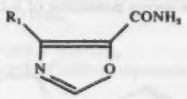
4,026,901

CONVERSION OF 4-LOWER ALKYLOXAZOLE-5-CARBOXAMIDE TO 4-LOWER ALKYL-5-CYANOOXAZOLES

David Llewellyn Coffen, Glen Ridge, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

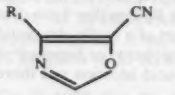
Filed Apr. 30, 1975, Ser. No. 573,226
Int. Cl.² C07D *263/34*
U.S. Cl. 260—307 R **9 Claims**

1. A process for the conversion of a compound having the formula:



I

wherein R_1 is lower alkyl; to a compound having the formula:



II

wherein R_1 is as defined above; by catalytic dehydration consisting essentially of introducing compound I into a column packed with a solid catalyst selected from the group consisting of molecular sieve 5A, silica, α-alumina, P_2O_5 supported on silica, P_2O_5 supported on molecular sieve 5A, P_2O_5 supported on α-alumina, P_2O_5 supported on charcoal and P_2O_5 supported on porous carborundum, said column having a length to diameter ratio of from about 5 to about 65 and being heated to a temperature of from 200° C. to 600° C.

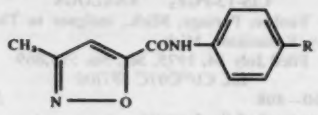
4,026,902

ISOXAZOLE DERIVATIVES

Tsutomu Irikura, Tokyo, Japan, assignor to Kyorin Pharmaceutical Co., Ltd., Tokyo, Japan

Filed June 4, 1976, Ser. No. 692,908
Claims priority, application Japan, June 21, 1975, 50-76176
Int. Cl.² C07D *261/10*
U.S. Cl. 260—307 H **4 Claims**

1. A compound of the formula



in which R is carboxy, ethoxycarbonyl or carbamoyl.

4,026,903

SUBSTITUTED 5-NITROIMIDAZOLES

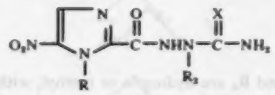
Goro Asato, Titusville; Gerald Berkelhammer, Princeton, and William Henry Gastrock, Hightstown, all of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 409,505, Oct. 25, 1973, Pat. No. 3,940,411, which is a division of Ser. No. 202,568, Nov. 26, 1971, Pat. No. 3,790,589, which is a division of Ser. No. 863,378, Oct. 2, 1969, Pat. No. 3,649,638, which is a continuation-in-part of Ser. No. 766,984, Oct. 11, 1968, abandoned. This application Nov. 18, 1975, Ser. No. 632,941

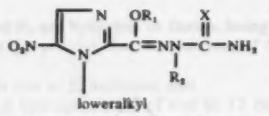
Int. Cl.² C07D *233/95*

U.S. Cl. 260—309 5 Claims

1. A compound selected from the group consisting of the formulae:



and



loweralkyl

wherein R is loweralkyl or hydroxyloweralkyl; R_1 is loweralkyl; and X is sulfur or oxygen.

4,026,904

AROMATIC EPOXY-TERMINATED POLYIMIDES

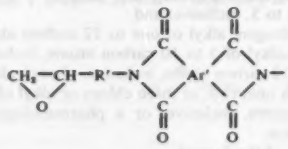
Gaetano F. D'Alelio, South Bend, Ind., assignor to University of Notre Dame, South Bend, Ind.

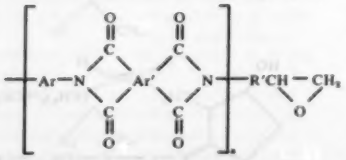
Continuation of Ser. No. 511,421, Oct. 2, 1974, abandoned. This application Feb. 25, 1976, Ser. No. 661,332

Int. Cl.² C07D *209/34*

U.S. Cl. 260—326 C 3 Claims

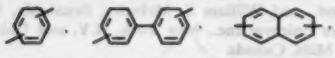
1. An epoxidized aromatic polyimide having the structural formula:





wherein

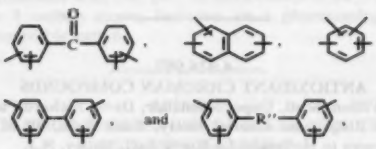
Ar is a divalent radical selected from the group consisting of



and multiples thereof not exceeding four connected to each other by R, wherein R is alkylene of 1 to 3 carbon atoms,

—O—, —S—, —CH=CH— or $—SO_2—$,

Ar′ is a tetravalent aromatic organic radical selected from the group consisting of



wherein R″ is $—CH_2—$, $—C_2H_4—$, $—C_3H_6—$, —O— or $—SO_2—$,

R′ is a divalent radical selected from the group consisting of $—C_6H_4—$, $—CH_2C_6H_4—$, $C_{10}H_6—$, and $—CH_2C_{10}H_6—$, and

n is a positive integer of 1 to 100.

4,026,905

ELECTRICALLY CONDUCTING ORGANIC SALTS

Morrel H. Cohen, Chicago, Ill.; Malcolm G. Miles, Ladue, and James D. Wilson, University City, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Dec. 26, 1972, Ser. No. 318,122

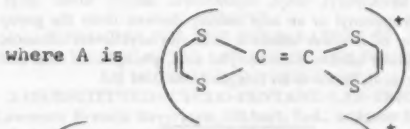
Disclosure was also published under the Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl. C07d *71/00*

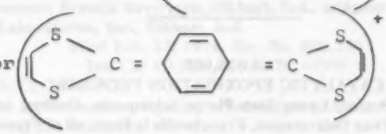
U.S. Cl. 260—327 M 5 Claims

1. A compound of the formula $A^+ B^-$

where A is

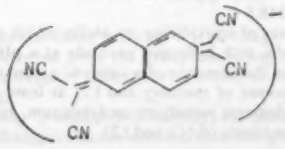


or



and B is

or



4,026,906
SUBSTITUTED DITHIIN TETROXIDE PLANT GROWTH REGULANTS

Arthur D. Brewer, Guelph, Canada; Robert W. Neidermyer, Carmel, Ind., and William S. McIntire, Senatobia, Miss., assignors to Uniroyal Inc., New York, N.Y. and Uniroyal, Ltd., Don Mills, Canada

Division of Ser. No. 357,757, May 7, 1973, Pat. No. 3,920,438.
Filed Jan. 10, 1975, Ser. No. 540,020
Int. Cl.² C07D *339/08*
U.S. Cl. 260—327 P **9 Claims**

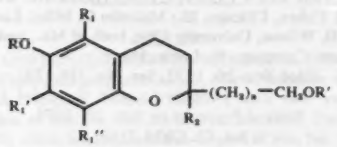
1. A chemical selected from the group consisting of: 2,3-dihydro-5,6-dimethyl-1,4-dithiin 1,1,4,4-tetroxide; 2-ethyl-5,6-dihydro-3-methyl-1,4-dithiin 1,1,4,4-tetroxide; 2,3-dihydro-2,5,6,-trimethyl-1,4-dithiin 1,1,4,4-tetroxide; 2-ethyl-2,3-dihydro-5,6-dimethyl-1,4-dithiin 1,1,4,4-tetroxide; 2,3-dihydro-2,3,5,6-tetramethyl-1,4-dithiin 1,1,4,4-tetroxide; 2-ethyl-5,6-dihydro-5,6-dimethyl-1,4-dithiin 1,1,4,4-tetroxide; 2-ethyl-5,6 -dihydro-3,5-dimethyl-1,4-dithiin 1,1,4,4-tetroxide; and 2-ethyl-5,6-dihydro-3,6-dimethyl-1,4-dithiin 1,1,4,4-tetroxide.

4,026,907
ANTIOXIDANT CHROMAN COMPOUNDS

John William Scott, Upper Montclair; David Richard Parrish, Glen Ridge, and Gabriel Saucy, Essex Fells, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 417,465, Nov. 19, 1973, Pat. No. 3,947,473, which is a continuation-in-part of Ser. No. 317,566, Dec. 22, 1972, abandoned. This application Dec. 4, 1975, Ser. No. 637,548
Int. Cl.² C07D *311/72*
U.S. Cl. 260—345.5 **2 Claims**

1. A compound of the formula:



wherein R_1, R_1' and R_1'' are hydrogen or lower alkyl; R_2 is hydrogen, lower alkyl or phenyl; R and R′ are hydrogen, benzyl, benzhydryl, trityl, alpha-lower alkoxy lower alkyl, tetrahydropyranyl or an acyl moiety derived from the group consisting of a lower alkanoic acid, an aryl lower alkanoic acid, a lower alkane dicarboxylic acid, phosphoric acid and carbonic acid; and *n* is an integer from 0 to 1.

4,026,908
CATALYTIC EPOXIDATION PROCESS

Michèle Pralus, Lyon; Jean-Pierre Schirmann, Oullins, and Serge-Yvon Delavarenne, Francheville le Haut, all of France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France

Filed Apr. 19, 1976, Ser. No. 678,129
Claims priority, application France, Apr. 18, 1975, 75.12061
Int. Cl.² C07D *301/12*
U.S. Cl. 260—348.5 L **9 Claims**

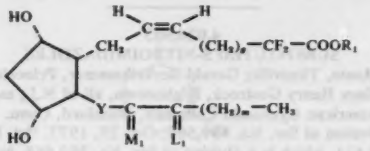
1. The process of epoxidizing an olefin which comprises reacting an olefin with hydrogen peroxide at a pH between about 6 and 9 in the presence of a catalytic amount of (1) at least one compound of mercury and (2) at least one compound of the elements vanadium, molybdenum, tungsten or titanium, or complexes of (1) and (2).

4,026,909
CIS-13-PGF$_2$ ANALOGS

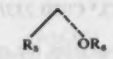
Ernest W. Yankee, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed July 14, 1975, Ser. No. 595,869
Int. Cl.² C07C *177/00*
U.S. Cl. 260—408 **36 Claims**

1. A compound of the formula



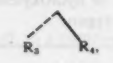
wherein Y is cis—CH=CH—; wherein *g* is 2, 3, or 4; wherein M_1 is



or

wherein R_5 and R_6 are hydrogen or methyl, with the proviso that one of R_5 and R_6 is methyl only when the other is hydrogen;

wherein L_1 is



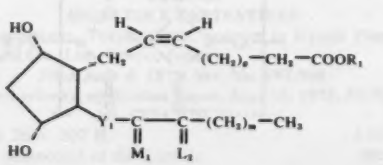
or a mixture of

wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is fluoro only when the other is hydrogen or fluoro;

wherein *m* is one to 5, inclusive; and

wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation.

19. A compound of the formula



wherein Y is cis—CH=CH—; wherein *g* is 2, 3, or 4; wherein M_1 is

or

wherein R_3 and R_6 are hydrogen or methyl, with the proviso tht one of R_5 and R_6 is methyl only when the other is hydrogen;

wherein L_1 is

or a mixture of

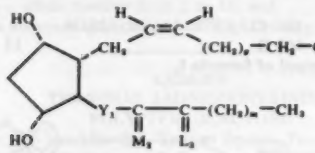
and

wherein R_3 and R_4 are hydrogen or fluoro, being the same or different, with the proviso that at least one of R_3 and R_4 is fluoro;

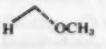
wherein *m* is one to 5, inclusive; and

wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation.

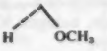
30. A compound of the formula



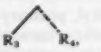
wherein Y is cis—CH=CH—; wherein *g* is 2, 3, or 4; wherein M_2 is



or



wherein L_2 is



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or a mixture of

and

wherein R_3 and R_4 are hydrogen or methyl, being the same or different;

wherein *m* is one to 5, inclusive; and

wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation.

4,026,910
OXIDATION PROCESS USING NICKEL PEROXIDE OXIDIZING AGENTS

Roman Marbet, Riehen, Switzerland, assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Filed July 23, 1975, Ser. No. 598,307

Claims priority, application Switzerland, Aug. 5, 1974, 10690/74

Int. Cl.² C11C *3/02*; C07C *45/16*

U.S. Cl. 260—410.9 R **6 Claims**

1. A process for converting α,β-unsaturated alcohols to the corresponding α,β-unsaturated carbonyl compounds comprising treating said alcohol with a nickel peroxide oxidizing agent prepared by treating a nickel (III) hydroxide with a strong oxidizing agent in an aqueous medium to form nickel peroxide as a precipitate and drying said precipitate to a weight of at least 110 g. per mole of nickel (II) hydroxide in said starting material, with the oxidizing step of said nickel (II) hydroxide and the drying step of said precipitate being carried out in the absence of carbon dioxide and water soluble carbonates.

4,026,911
PROCESS FOR THE PREPARATION OF KETOALKYNOIC ACIDS AND USE OF THE PROCESS IN AN IMPROVED SYNTHESIS OF 2-(SUBSTITUTED)-CYCLO-PENTANE-1,3,4-TRIONES

Lawrence Francis Reverman, Elkhart, Ind., assignor to Miles Laboratories, Inc., Elkhart, Ind.

Filed Feb. 23, 1976, Ser. No. 660,270

Int. Cl.² C11C *1/00*; C07C *69/00*

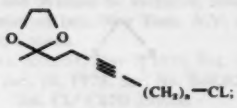
U.S. Cl. 260—413 **11 Claims**

1. A process for preparing a ketoalkynoic acid or its ester having the structure,

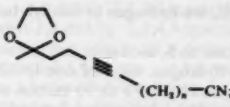
wherein and elsewhere hereafter *n* is an integer of the set 1–8 and R is selected from the group consisting of a hydrogen atom or a loweralkyl radical having from 1 to 3 carbon atoms, comprising:

a. reacting 2-methyl-2-(3-butynyl)-1,3-dioxolane with a α,ω-dihalogenoalkane selected from the group consisting

of Br-$(CH_2)_n$-Cl or I-$(CH_2)_n$-Cl in liquid ammonia in the presence of an alkali-metal amide to obtain a 2-methyl-2-(ω-chloroalkynyl)-1,3-dioxolane of the formula,



b. converting the 2-methyl-2-(ω-chloroalkynyl)-1,3-dioxolane to a corresponding nitrile having the structure,



with a cyanide salt in a polar organic solvent;

c. hydrolyzing the nitrile under alkaline conditions to obtain the corresponding ketoalkynoic acid;

d. and optionally esterifying the ketoalkynoic acid with an alcohol selected from the group consisting of methanol, ethanol, or propanol.

4,026,912
CARBORANYLDIFERROCENYLMETHYL PERCHLORATE

David C. Sayles, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 3, 1971, Ser. No. 120,682
Int. Cl.² C07F 17/02, 5/02
U.S. Cl. 260—439 CY 1 Claim

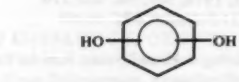
1. The compound carboranyldiferrocenylmethyl perchlorate.

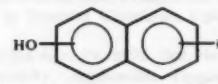
4,026,913
CYANIC ACID ESTERS OF AROMATIC POLYCARBONATES

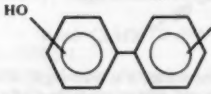
Mineaki Tanigaichi; Morio Gaku; Kazuyuki Ohya, all of Tokyo; Susumu Motoori, Kashiwa, and Kazuo Noguchi, Matsudo, all of Japan, assignors to Mitsubishi Gas Chemical Co., Ltd., Tokyo, Japan

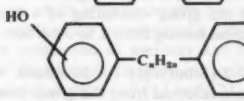
Filed Mar. 25, 1976, Ser. No. 670,544
Claims priority, application Japan, Apr. 2, 1975, 50-40641
Int. Cl.² C07C 69/96
U.S. Cl. 260—463 19 Claims

1. A cyanic acid ester of an aromatic polycarbonate obtained by reacting an aromatic polycarbonate having one or two terminal hydroxyl groups and prepared from an aromatic dihydroxy compound represented by one of the formulas I to X:


I


II


III


IV

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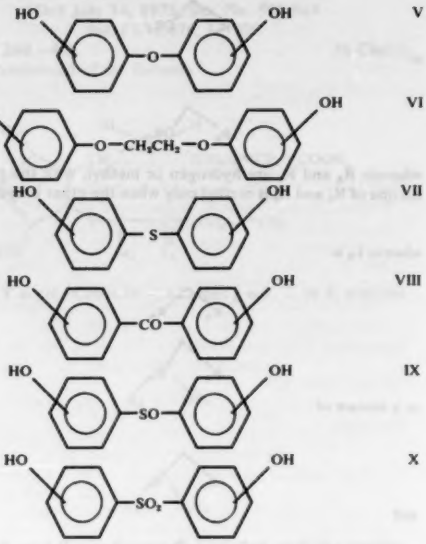
(n is an integer of 1 to 4, inclusive)


V VI VII VIII IX X

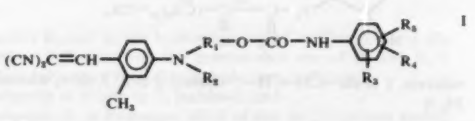
or a mono-, di-, tri- or tetra-halogeno-nuclear substituted derivative of an aromatic dihydroxy compound represented by one of the formulas I to X, through the phosgene method or the ester interchange method, with a cyanogen halide in the presence of a base in an inert solvent.

4,026,914
STYRYL DYES

Ulrich Zirngibl, Oberwil, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

Filed Sept. 29, 1975, Ser. No. 617,822
Claims priority, application Switzerland, Oct. 4, 1974, 13381/74
Int. Cl.² C07C 121/70, 125/06
U.S. Cl. 260—465 D 11 Claims

1. A compound of formula I,


I

in which

R_1 is C_{2-6}alkylene or C_{5-6}cycloalkylene,

R_2 is C_{5-6}cycloalkyl, unsubstituted or substituted by up to 3 methyl groups; or C_{1-6}-alkyl, unsubstituted or substituted by a C_{1-4}alkoxy, C_{1-4}alkylthio, C_{1-4}alkylcarbonyloxy, C_{1-4}alkoxycarbonyloxy or C_{1-4}alkoxycarbonyl,

either R_3 is hydrogen, halogen, C_{1-4}alkyl, C_{1-4}-alkoxy or C_{1-4}alkoxycarbonyl,

and R_4 is halogen, cyano, trifluoromethyl, C_{5-6}-cycloalkyl, C_{1-4}alkoxy, C_{5-6}cycloalkoxy, C_{1-4}alkylthio, C_{5-6}cycloalkylthio, phenyl, phenoxy, phenylthio, phenylthio-C_{1-4}alkyl, phenyl-C_{1-4}alkyl, phenoxy-C_{1-4}alkyl, C_{1-4}alkoxycarbonyl, C_{5-6}-cycloalkoxycarbonyl, phenoxycarbonyl, benzoyl, benzoyloxy, phenoxycarbonyloxy, or phenyl-C_{1-4}-alkylthio,

or R_3 and R_4 are located on adjacent carbon atoms and,

together with such atoms, form a 5- or 6-membered, otherwise saturated, unsaturated or aromatic, carbocyclic ring, optionally having a benzene ring fused thereto, and

R_5 is hydrogen, chlorine, bromine, methyl or methoxy;

any alkyl or alkoxy radical as R_3 or R_4 being optionally substituted by C_{1-4}alkoxy, phenyl or C_{1-4}-alkoxycarbonyl;

any cycloalkyl radical or moiety as or contained in R_4 being optionally substituted by up to 3 methyls or by C_{1-4}alkoxy, phenyl or C_{1-4}alkoxycarbonyl;

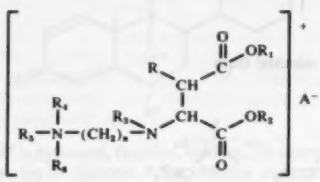
any phenyl radical or moiety as or contained in R_4 being optionally substituted by up to two substituents selected from halogen, methyl, C_{1-4}alkoxy and C_{1-4}alkoxycarbonyl, with the proviso that any alkoxy radical substituted by alkoxy is of at least two carbon atoms.

4,026,915
DI-MIXED ALKY ASPARTATE SALTS

Fred L. Billman, and Hung-Hee H. Lee, both of Racine, Wis., assignors to S. C. Johnson & Son, Inc., Racine, Wis.

Filed Aug. 27, 1975, Ser. No. 608,376
Int. Cl.² C07C *103/54, 103/48*
U.S. Cl. 260—471 A **16 Claims**

1. A compound having the formula



wherein:

R is hydrogen or methyl;

R_1 and R_2 are the same or different and are selected from linear and branched chain alkyl groups having 8 to 22 carbon atoms;

R_3 is selected from formyl, and acetyl;

R_4 and R_5 are the same or different and selected from lower alkyl groups having 1 to 4 carbon atoms, and ω-hydroxy-alkyl groups having 2 to 4 carbon atoms;

R_6 is selected from hydrogen, lower alkyl having 1 to 4 carbon atoms and benzyl;

n is a whole number from 2 to 10; and

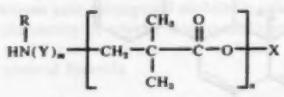
A is an anion imparting water dispersability.

4,026,916
TERMINAL AMINE-CONTAINING POLYPIVALOLACTONE

Walter Raymond Hertler, Kennett Square, Pa., assignor to E. I. Du Pont de Nemours & Company, Wilmington, Del.

Filed Mar. 15, 1976, Ser. No. 667,280
Int. Cl.² C08G *63/02*
U.S. Cl. 260—471 R **6 Claims**

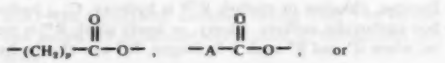
1. A terminal amine-containing polypivalolactone of the formula



in which

R is H or lower alkyl,

Y is



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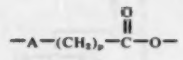


where

p is 1 to 5, and

A is phenylene, (lower alkyl)phenylene, di(lower alkyl)-phenylene, naphthylene or biphenylene,

n is 2 to 1000, *m* is 0 or 1, and

X is H, alkali metal or R'_4N where R' is lower alkyl.

4,026,917
METHOD OF REMOVING POLYNUCLEAR AROMATIC COMPOUNDS BY ADSORPTION WITH COCONUT CHARCOAL

David L. Stalling; James N. Huckins, both of Columbia, and James L. Johnson, Fulton, all of Mo., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Feb. 11, 1975, Ser. No. 549,127
Int. Cl.² C07C *69/76*
U.S. Cl. 260—473 G **8 Claims**

1. A method for separating polynuclear aromatic compounds selected from the group consisting of chlorinated -dibenzodioxins, -naphthalenes, -dibenzofurans and mixtures thereof from a mixture in which the major constituents are other than polynuclear aromatic compounds by passing the mixture through a column containing granular coconut charcoal to cause substantially irreversible adsorption of said polynuclear aromatic compounds.

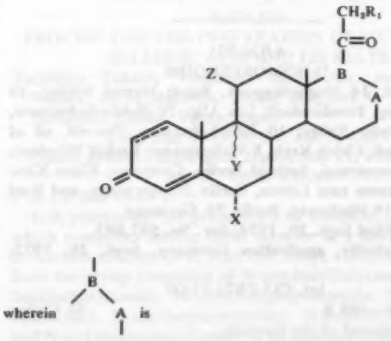
3. The method of claim 1 in which said mixture comprises 2,4-dichlorophenoxyacetic acid, 2,4,5-trichlorophenoxyacetic acid, the lower alkyl esters of said acids or the amine salts of said acids and said polynuclear aromatic compounds are chlorinated dibenzo-p-dioxins.

4,026,918
D-HOMOSTEROIDS

Andor Fürst, 14 Magnolienpark, Basel; Marcel Müller, 10 Quellenweg, Frenkendorf; Leo Alig, 76 Heidenlochstrasse, Liestal; Peter Keller, 10 Bahnhofstrasse, Therwil, all of Switzerland; Ulrich Kerb, 8 Waitzstrasse; Rudolf Wiechert, 8a Petzowerstrasse, both of Berlin, Germany; Klaus Kieslich, 4 Strasse zum Lowen, Berlin 39, Germany, and Karl Petzoldt, 10 Flachsweg, Berlin 38, Germany

Filed Sept. 20, 1974, Ser. No. 507,882
Claims priority, application Germany, Sept. 26, 1973, 2349023
Int. Cl.² C07J *63/00*
U.S. Cl. 260—488 B **8 Claims**

1. A compound of the formula



wherein A is

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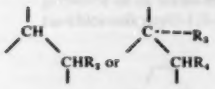


wherein R_2 is hydrogen or methyl, R_3 is hydroxy or C_{1-6} alkanoic acid acyloxy, and, R_4 is methyl, hydroxy or C_{1-6} alkanoic acid acyloxy; R_1 is hydrogen, fluoro, chloro, hydroxy, C_{1-16} hydrocarbon carboxylic acid acyloxy, sulfato or phosphato; X is hydrogen, fluoro or methyl; Y is hydrogen and Z is alpha-hydroxy, or alpha-lower alkanoyloxy, or Z is alpha-hydroxy, alpha-lower alkanoyloxy or hydrogen when both R_1 and R_2 are substituents other than hydrogen; or Y and Z taken together is a carbon to carbon bond; and the dotted line in the 1,2-position together with the corresponding solid line denotes a single or double bond provided that there is a double bond in the 1,2-position when X and R_2 or X and R_4 each independently are hydrogen or methyl.

4,026,919

PGD$_2$ SUBSTITUTED ESTERS

Walter Morozowich, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Oct. 23, 1975, Ser. No. 625,288

Int. Cl.² C07C *177/00*

U.S. Cl. 260—468 D **4 Claims**

1. PGD$_2$ p-benzamidophenyl ester.
2. PGD$_2$ p-(p'-acetamidobenzamido)phenyl ester.
3. PGD$_2$ p-acetylphenyl ester.
4. PGD$_2$ semicarbazono-p-tolyl ester.

4,026,920

CHROMIUM MODIFIED MANGANESE FERRITE OXIDATIVE DEHYDROGENATION CATALYSTS

Harold E. Manning, Houston, Tex., assignor to Petro-Tex Chemical Corporation, Houston, Tex.

Division of Ser. No. 289,177, Sept. 14, 1972, Pat. No. 3,859,375, which is a continuation-in-part of Ser. No. 78,956, Oct. 7, 1970, Pat. No. 3,751,385. This application July 2, 1974, Ser. No. 485,306

Int. Cl.² B01J *23/64*

U.S. Cl. 252—470 **6 Claims**

1. An oxidative dehydrogenation catalyst consisting essentially of manganese ferrite containing from 0.05 to 0.4 atom of chromium per atom of manganese.

4. The oxidative dehydrogenation catalyst according to claim 1 prepared by intimately contacting an active compound of iron with an active compound of manganese with a reactive compound of chromium in an atom ratio of Cr to Mn in the range of 0.05 : 1 to 0.2 : 1 at a temperature high enough to form a ferrite to 800° C said iron, manganese and chromium compounds being oxides, hydroxides or salts.

4,026,921

D-HOMOSTEROIDS

Andor Fürst, 14 Magnolienpark, Basel; Marcel Müller, 10 Quellenweg, Frenkendorf; Leo Alig, 76 Heidenlochstrasse, Liestal; Peter Keller, 10 Bahnhofstrasse, Therwil, all of Switzerland; Ulrich Kerb, 8 Waitzstrasse; Rudolf Wiechert, 8a Petzowerstrasse, both of Berlin, Germany; Klaus Kieslich, 4 Strasse zum Lowen, Berlin 39, Germany, and Karl Petzoldt, 10 Flachsweg, Berlin 38, Germany

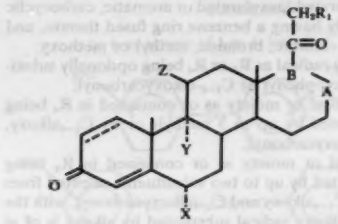
Filed Sept. 20, 1974, Ser. No. 507,883

Claims priority, application Germany, Sept. 26, 1973, 2349022

Int. Cl.² C07J *63/00*

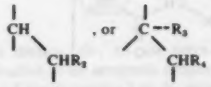
U.S. Cl. 260—488 B **31 Claims**

1. A compound of the formula



wherein — — — is a single bond or double bond in the 1,2-position, X is hydrogen, fluoro or methyl; Y is hydrogen or fluoro when Z is β-hydroxy or when Y is chloro, Z is β-hydroxy, β-fluoro or β-chloro; R_1 is hydrogen, fluoro, chloro, hydroxy, or hydroxy esterified with C_{1-16} hydrocarbon carboxylic acid acyl, sulfate or phosphate and

is a group selected from



in which R_2 is hydrogen or methyl; R_3 is hydroxy or C_{1-6} alkanoic acid acyloxy, and R_4 is methyl, hydroxy or C_{1-6} alkanoic acid acyloxy provided that there is a double bond in the 1,2 position when X and R_2 or X and R_4 each independently are hydrogen or methyl.

4,026,922

D-HOMO-PREGNENE STEROIDS

Leo Alig, 76 Heidenlochstrasse, Liestal; Andor Furst, 14 Magnolienpark, Basel; Marcel Muller, 10 Quellenweg, Frenkendorf, all of Switzerland; Ulrich Kerb, 8 Waitzstrasse, and Rudolf Wiechert, 5 Petzowerstrasse, both of Berlin, Germany

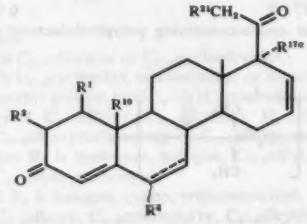
Filed Oct. 2, 1975, Ser. No. 619,065

Claims priority, application Switzerland, Oct. 7, 1974, 13424/74; Dec. 2, 1974, 15950/74; Mar. 13, 1975, 3195/75

Int. Cl.² C07J *63/00*

U.S. Cl. 260—488 B **35 Claims**

1. A D-homosteroid of the formula



(I)

wherein R^1 and R^2 each is hydrogen or R^1 and R^2 together are 1α,2α-methylene or a carbon-carbon bond; R^9 is hydrogen, fluorine, chlorine or methyl; $R^{17\alpha}$ is hydroxy, C_{1-15} hydrocarbon carboxylic acyloxy, alkoxy, or lower alkyl; R^{10} is methyl or, when R^1 and R^2 each is hydrogen, R^{10} can also be hydro-

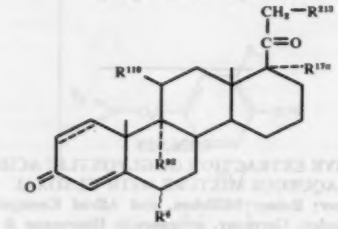
gen; R^{21} is hydrogen, fluorine or chlorine and the broken line in the 6,7-position is an optional carbon-carbon bond.

4,026,923
D-HOMOSTEROIDS

Leo Alig, Liestal; Andor Fürst, Basel, and Marcel Müller, Frenkendorf, all of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 501,558, Aug. 29, 1974, Pat. No. 3,939,193. This application Nov. 6, 1975, Ser. No. 629,439
Claims priority, application Switzerland, Sept. 26, 1973, 13764/73
Int. Cl.² C07J *63/00*
U.S. Cl. 260—488 B **4 Claims**

1. A D-homosteroid of the formula



wherein R^6 is hydrogen, fluorine, chlorine, bromine or methyl; $R^{11\beta}$ is fluorine or chlorine; $R^{9\alpha}$ is chlorine or bromine; $R^{21\beta}$ is halogen, hydroxy, hydrocarbon $C_{1\text{-}15}$ acyloxy or R; R is a sulfate or phosphate radical or the radical of a hydrocarbon aliphatic dicarboxylic or tricarboxylic acid in the form of a water-soluble salt; $R^{17\alpha}$ is hydroxy or hydrocarbon $C_{1\text{-}15}$ acyloxy and the broken line in the 1,2-position denotes an optional bond, said hydrocarbon $C_{1\text{-}15}$ acyloxy groups being derived from a hydrocarbon monocarboxylic acid having 1–15 carbon atoms.

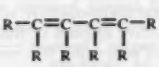
4,026,924
PROCESS OF PREPARING DIACYLOXY OLEFINS

Paul R. Stapp, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

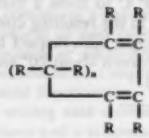
Filed Apr. 10, 1975, Ser. No. 566,753
Int. Cl.² C07C *67/05*
U.S. Cl. 260—497 R **10 Claims**

1. A process for the production of unsaturated diesters which comprises reacting under reaction conditions a conjugated diolefin with a carboxylic acid in the presence of free oxygen and a catalytic amount of a catalyst system consisting of an alkali metal compound selected from the group consisting of the carboxylates and oxides thereof and a compound of a metal selected from the group consisting of gold and silver, said gold or silver compound being selected from the group consisting of the carboxylates, sulfates and oxides thereof

wherein said conjugated diolefin is selected from the group consisting of acyclic conjugated diolefins having from 4 to 16 carbon atoms per molecule represented by the general formula



and cyclic conjugated diolefins having from 5 to 16 carbon atoms per molecule represented by the general formula



wherein, in each formula, each R is independently selected from the group consisting of hydrogen, halogen, cyano, —COOR′, and alkyl, aryl and cycloalkyl radical groups and combinations thereof, of up to 12 carbon atoms per radical group, wherein R′ is selected from the group consisting of hydrogen, alkyl of up to 10 carbon atoms and aryl of up to 10 carbon atoms and *n* is an integer having a value of 1 to 12; and

wherein said carboxylic acid is selected from the group consisting of monocarboxylic acids having from 2 to 18 carbon atoms per molecule represented by the general formula

R″—COOH

and dicarboxylic acids having from 2 to 18 carbon atoms per molecule represented by the general formula

R‴(COOH)₂

wherein R″ is selected from the group consisting of alkyl, cycloalkyl and aryl radical groups and halogen, cyano and —COOR′ substituted derivatives thereof, wherein up to four of said halogen, cyano or —COOR′ substituents can be present in said radical, wherein R′ is selected from the group consisting of hydrogen, alkyl of up to 10 carbon atoms and aryl of up to 10 carbon atoms; and

wherein R‴ is selected from the group consisting of a valence bond and alkylene, cycloalkylene and arylene radical groups and halogen, cyano and —COOR′ substituted derivatives thereof wherein up to four of said halogen, cyano or —COOR′ substituents can be present in said radical, wherein R′ is as defined above.

4,026,925
ACTIVE DERIVATIVES OF METHYLAMINE, THERAPEUTIC COMPOSITIONS CONTAINING THE SAME AND PROCESSES FOR PREPARING THE SAID DERIVATIVES AND COMPOSITIONS

Charles Pigerol, Saint-Ouen; Pierre Eymard, Fontaine; Jean-Claude Vernieres, La Tronche, and Jean-Pierre Werbenec, Seyssinet, all of France, assignors to Labaz, Paris, France

Filed May 15, 1975, Ser. No. 577,732
Int. Cl.² C07C *87/06, 87/24;* **A61K** *31/13*
U.S. Cl. 260—501.1 **1 Claim**

1. 1,1-Di-n-propyl-n-butylamine acid fumarate.

4,026,926
PROCESS FOR THE PREPARATION OF METHALLYL SULFONIC ACID AND ITS SALTS

Toshihiro Takata; Yoshifumi Kawakatsu, and Keitsugu Nohara, all of Shizuoka, Japan, assignors to Toho Beslon Kabushiki Kaisha, Tokyo, Japan

Filed July 8, 1975, Ser. No. 594,019
Claims priority, application Japan, July 11, 1974, 49-79420
Int. Cl.² C07C *143/16*
U.S. Cl. 260—513 T **5 Claims**

1. A process for the preparation of methallyl sulfonic acid which comprises adding sulfur trioxide to a halogenated hydrocarbon solution of at least one amide compound selected from the group consisting of N-tert-butylbutyramide, N-tert-butylisobutyramide, N-tert-butylpropionamide, N-tert-butylvaleramide, N-tert-butylacrylamide, N-tert-octylacrylamide, and N-tert-dodecylacrylamide in an approximately equimolar

amount with respect to said amide compound at a temperature of between about −10° and 20° C to form a complex thereof, and then adding isobutylene to the resulting complex solution in at least an equimolar amount with respect to the sulfur trioxide at a temperature of between about 20° and 60° C to form the methallyl sulfonic acid.

4,026,927
NOVEL PROSTAGLANDIN DERIVATIVES

Masuo Murakami; Noriyoshi Inukai, both of Tokyo; Hidenori Iwamoto, Ageo; Toshinari Tamura; Isao Yanagisawa, both of Tokyo; Osamu Hasegawa, Fukuoka; Yoshio Ishii, Omiya; Hideya Matsuda, Urawa; Tetsuya Shiozaki, Misato, and Kenichi Tomioka, Kitamoto, all of Japan, assignors to Yamanouchi Pharmaceutical Co., Ltd., Tokyo, Japan

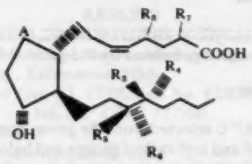
Filed Sept. 23, 1974, Ser. No. 508,252

Claims priority, application Japan, Sept. 25, 1973, 48-107772; Apr. 15, 1974, 49-41885

Int. Cl.² C07C *177/00*

U.S. Cl. 260—514 D **4 Claims**

1. A compound of the formula



wherein A represents

one of R_3 and R_4 represents a hydrogen atom and the other of them represents a straight chain or branched chain alkyl group having 1–4 carbon atoms, one of R_5 and R_6 represents a hydrogen atom and the other of the represents a hydroxyl group, and one of R_7 and R_8 represents a hydrogen atom and the other of them represents a straight chain or branched chain alkyl group having 1–4 carbon atoms.

4,026,928
LOW MOLECULAR WEIGHT VINYL POLYMERS AND PROCESS FOR PREPARING

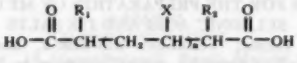
Sohan S. Chaudhary, Monroeville, Pa., and Edward M. Fettes, Oak Brook, Ill., assignors to ARCO Polymers, Inc., Philadelphia, Pa.

Filed Oct. 27, 1970, Ser. No. 84,526

Int. Cl.² C07C *63/56*

U.S. Cl. 260—515 A **4 Claims**

1. Low molecular weight vinyl polymers having chain terminating reactive groups having the general formula



in which

R_1 is hydrogen, lower alkyl having 1 to 4 carbon atoms, or halogen;

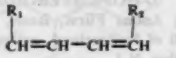
R_2 is hydrogen, lower alkyl having 1 to 4 carbon atoms, or halogen;

X is aryl, free from ethylenic unsaturation and hydroxyl groups; and

n is from 5 to 50.

3. A process for the preparation of low molecular weight vinyl polymers terminated with reactive end groups which comprises:

conducting a free radical polymerization of from about 83 mol.% to about 98 mol.% of an aryl substituted ethene with from about 17% to about 2% of a diene having the general formula:



in which R_1 and R_2 are hydrogen, lower alkyl having 1 to 4 carbon atoms, or halogen;

collecting the solid polymer resulting from the polymerization and dissolving it in an anhydrous solvent which is inert to ozone; ;p1 ozonizing the dissolved polymer by introducing ozone into the solution; and

oxidizing to cleave the resulting ozonide to so form a low molecular weight vinyl polymer terminated on each of its ends with carboxylic acid end groups.

4,026,929
SELECTIVE EXTRACTION OF GLYOXYLIC ACID FROM AQUEOUS MIXTURE WITH GLYOXAL

Kurt Bauer; Reiner Mölleken, and Alfred Krempel, all of Holzminden, Germany, assignors to Haarmann & Reimer GmbH, Holzminden, Germany

Filed Dec. 29, 1975, Ser. No. 645,112

Claims priority, application Germany, Jan. 17, 1975, 2501743

Int. Cl.² C07C *59/30*

U.S. Cl. 260—535 R **3 Claims**

1. A process for isolating glyoxylic acid from an aqueous solution containing glyoxylic acid and glyoxal, comprising mixing the solution with at least one solvent selected from the group consisting of an aliphatic or cycloaliphatic alcohol containing about 4 to 8 carbon atoms, a ketone containing about 4 to 8 carbon atoms, and an ester of an aliphatic carboxylic acid and aliphatic alcohol each containing up to about 6 carbon atoms, the ester containing a total of about 3 to 8 carbon atoms, allowing the mixture to stratify and separating the solvent layer enriched in glyoxylic acid.

4,026,930
AZEOTROPIC DISTILLATION OF 1,1,1,3,3,3-HEXAFLUOROISOPROPYL TRIFLUOROACETATE WITH FLUOROTRICHLOROMETHANE

Geir Bjornson, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 596,032, July 14, 1975, Pat. No. 3,990,989. This application May 7, 1976, Ser. No. 684,349

Int. Cl.² B01D *3/36*

U.S. Cl. 260—539 A **6 Claims**

1. A method of separating 1,1,1,3,3,3-hexafluoroisopropyl trifluoroacetate from a crude reaction mixture obtained from the preparation of 1,1,1,3,3,3-hexafluoroisopropyl trifluoroacetate comprising adding an effective amount of fluorotrichloromethane to said mixture and subjecting the resulting composition to fractional distillation to produce an azeotrope consisting of said 1,1,1,3,3,3-hexafluoroisopropyl trifluoroacetate and said fluorotrichloromethane which is distilled from said mixture.

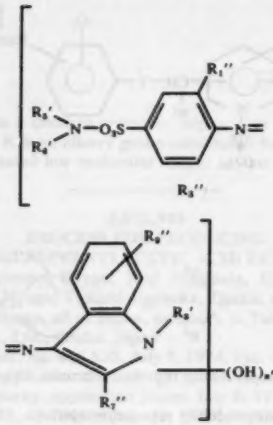
4,026,931

PROCESS FOR DYEING POLYURETHANE PLASTICS

Manfred Wiesel; Richard Sommer, both of Leverkusen; Georg Pape, Opladen, and Michael Kressner, Odenthal, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed July 25, 1975, Ser. No. 599,031
Claims priority, application Germany, Aug. 3, 1974, 2437489
Int. Cl.² C08K 5/23, 5/43
U.S. Cl. 260—2.5 AK 6 Claims

1. A process for dyeing polyurethane plastic by incorporating a dye in the reaction mixture used to prepare the polyurethane by polyaddition reaction or to one of the components of the polyaddition reaction mixture, before or during polyaddition; said dye being capable of forming covalent bonds with said polyurethane, said dye having the formula



in which

n' is 1, 2 or 4;

R_1'' is cyano, chlorine, bromine or methyl;

R_3'' is hydrogen, chlorine, bromine or methyl;

R_5' is hydrogen; alkyl; cyclohexyl; benzyl; phenethyl; phenyl; tolyl; tolyl substituted by hydroxy, cyano, chlorine, bromine or C_1-C_4 alkoxy;

R_6' is hydrogen; C_1-C_4 alkyl; benzyl; phenethyl; phenyl; tolyl; tolyl substituted by hydroxy, cyano, chlorine, bromine or C_1-C_4 alkoxy; or

R_6' together with R_5' and the nitrogen atom are pyrrolidinyl, piperidinyl or morpholinyl;

R_7'' is methyl, ethyl, phenyl, p-biphenyl, or o-, m- or p-chlorophenyl;

R_9' is hydrogen; C_1-C_4 alkyl; or C_1-C_4-alkyl substituted by OH, CN, $CONH_2$ or COOH;

R_9'' is hydrogen, chlorine, bromine, methyl, ethyl, methoxy or ethoxy;

wherein the OH-groups are attached to the molecule through alkylene radicals.

4,026,932

METHOD FOR CONVERTING ALKENOIC ACID COPOLYMER LATEXES INTO WATER SOLUTIONS

James Richard Gross; James Larry Potter, and Frederick Bernhard Kassell, all of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Dec. 11, 1975, Ser. No. 640,599
Int. Cl.² C08L 33/02
U.S. Cl. 260—29.6 H 10 Claims

1. A method for converting an alkyl acrylate-alkenoic acid copolymer latex into a water soluble solution of the alkali metal salts of said copolymer which comprises the steps of

A. combining a stream of said latex containing 10 to 55% by weight of said copolymer with an aqueous stream containing an alkali metal hydroxide in an amount in molar excess of that required for neutralization of the alkenoic acid functionality;

B. mixing said combined streams under low shear conditions and a temperature range from 40°–90° C to achieve a substantially homogeneous mixture wherein the shearing of the copolymer and the viscosity of the mixture are minimized; and

C. heating said mixture to a temperature range from about 40° to about 90° C for a time sufficient to allow the excess alkali metal hydroxide to saponify the alkyl acrylate moieties in the copolymer equivalent to said excess alkali metal hydroxide.

4,026,933

PARTICULATE OIL-BLACK MASTERBATCH

Douglas Cameron Edwards, and Erhardt Fischer, both of Sarnia, Canada, assignors to Polysar Limited, Sarnia, Canada

Filed Feb. 9, 1976, Ser. No. 656,272
Claims priority, application Canada, Mar. 20, 1975, 222659
Int. Cl.² C08C 1/14; C08F 6/22; C08J 3/20; C08K 5/01
U.S. Cl. 260—33.6 AQ 7 Claims

1. A process for the preparation of a particulate rubber masterbatch of emulsion polymerized synthetic rubber selected from butadiene-styrene rubber, polybutadiene rubber and butadiene-acrylonitrile rubber, carbon black and compatible plasticizer, which comprises the sequential steps of:

preparing an aqueous mixture of synthetic rubbery polymer latex and carbon black;

co-coagulating the polymer and carbon black to form a rubber-black masterbatch;

treating the rubber-black masterbatch with a halogenating agent selected from brominating and chlorinating agents in such an amount that the rubbery polymer contains from about 1 to about 5 parts by weight of halogen per 100 parts by weight of rubbery polymer;

adding compatible plasticizer to be treated rubber black masterbatch; and

allowing the plasticizer to be absorbed by the treated rubber-black masterbatch to yield a rubber-black-plasticizer masterbatch in particulate form.

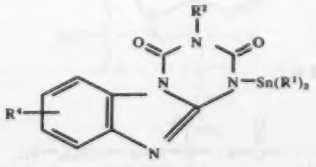
4,026,934

1-TRIORGANO-STANNYL-3-SUBSTITUTED-2,4-DIOXO-1,2,3,4-TETRAHYDRO-s-TRIAZINO-[1,2-a]-BENZIMIDAZOLES

Werner Daum, Krefeld; Wolfgang Behrenz, Overath-Steinenbrueck; Ingeborg Hammann, Cologne; Hans Scheinpflug, Leverkusen, and Wilhelm Brandes, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed June 4, 1976, Ser. No. 693,037
Claims priority, application Germany, June 26, 1975, 2528623
Int. Cl.² A61K 31/32; C07D 487/04
U.S. Cl. 424—245 10 Claims

1. A 1-triorgano-stannyl-3-substituted-2,4-dioxo-1,2,3,4-tetrahydro-s-triazino-[1,2-a]-benzimidazole of the formula



in which

R^1 is alkyl or cycloalkyl with 4 to 8 carbon atoms, or phenyl, and

R^2 is alkyl with 1 to 1 carbon atoms optionally substituted by chlorine, CN, alkoxycarbonyl with 1 to 5 carbon atoms in the alkoxy moiety, alkenoxycarbonyl with up to 5 carbon atoms in the alkenoxy moiety, phenyl, alkylaminocarbonyl with 1 to 5 carbon atoms in the alkylamino moiety, N-morpholino or dialkylamino with 1 to 6 carbon atoms per alkyl group; dialkylamino with 1 to 6 carbon atoms per alkyl group; cyclohexyl or phenyl,

R^4 is hydrogen or alkyl with 1 to 4 carbon atoms.

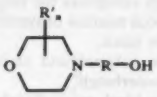
9. A method of combating insects, acarids or fungi which comprises applying to the insects, acarids or fungi or to a habitat thereof an insecticidally, acaricidally or fungicidally effective amount of a compound according to claim 1.

4,026,935
PRODUCTION OF BIS-(MORPHOLINO-N-ALKYL) ETHERS

Michael E. Brennan; Philip H. Moss, and Ernest L. Yeakey, all of Austin, Tex., assignors to Texaco Development Corporation, New York, N.Y.

Filed June 2, 1975, Ser. No. 583,014
Int. Cl.² C07D 295/12, 265/28
U.S. Cl. 260—246 B **14 Claims**

1. A process for producing a bis-(morpholino-N-alkyl) ether compound from the corresponding N-(hydroxyalkyl)-morpholine compound, said N-(hydroxyalkyl)morpholine compound having the formula:



wherein R is a straight chain alkyl radical of from 2 to about 10 carbon atoms, R′ is a lower alkyl radical, and *n* is an integer from 0 to 4 comprising the steps of:

contacting said N-(hydroxyalkyl)morpholine compound with a catalytically effective amount of silica-alumina having an alumina content of from about 5 to about 50 wt. % at a temperature of from about 200° C to about 300° C under a pressure sufficient to maintain the mixture substantially in liquid phase; and

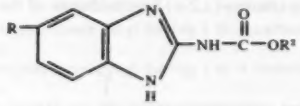
recovering said bis-(morpholino-N-alkyl) ether compound from the reaction mixture.

4,026,936
ANTHELMINTIC PYRIDINE AND THIAZOLE SUBSTITUTED BENZIMIDAZOLE CARBAMATES

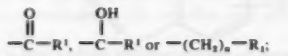
Rudolph Frank Lauer, Nutley, and Armin Walser, West Caldwell, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Aug. 7, 1975, Ser. No. 602,695
Int. Cl.² C07D 235/32
U.S. Cl. 260—294.8 C **13 Claims**

1. A compound represented by the formula



wherein R is



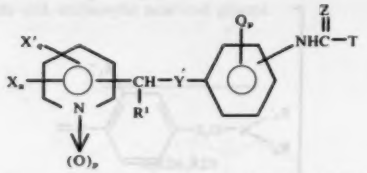
R^1 is 2-pyridyl, 3-pyridyl, or 4-pyridyl and R^2 is lower alkyl and *n* is 1 or 2, and pharmaceutically acceptable acid addition salts of the compounds wherein R^1 is 2-pyridyl, 3-pyridyl or 4-pyridyl.

4,026,937
SUBSTITUTED PYRIDINYLALKOXY-PYRIDINYLALKYLSULFONYL- AND PYRIDINYLALKYLTHIO-PHENYLUREAS

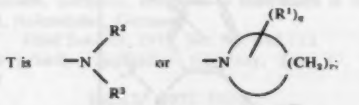
Alin H. Gulbenk, Walnut Creek, Calif., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 435,608, Jan. 22, 1974, Pat. No. 3,931,200. This application Oct. 14, 1975, Ser. No. 622,313
Int. Cl.² C07D 401/12
U.S. Cl. 260—293.69 **12 Claims**

1. A compound of the formula



wherein:



each X independently represents bromo, chloro, fluoro or iodo;

each X′ independently represents cyano;

n represents an integer of 0 to 4, inclusive;

each *q* independently represents an integer of 1 or 2, inclusive;

each *p* independently represents an integer of 0 or 1;

r represents an integer of 4 or 5;

each R^1 is hydrogen or methyl;

Y is a chalcogen of atomic number 8 to 16, inclusive or $-SO_2-$;

Q is methyl, ethyl or halo;

Z is a chalcogen of atomic number 8 to 16, inclusive;

R^2 represents hydrogen, alkyl of from 1 to 4 carbon atoms, inclusive or alkoxy of from 1 to 4 carbon atoms, inclusive; and

R^3 represents alkyl of from 1 to 4 carbon atoms, inclusive.

4,026,938
1-PHENYL-3-AZACARBOCYCLIC-UREAS

Guy D. Diana, Stephentown, N.Y., assignor to Sterling Drug Inc., New York, N.Y.

Division of Ser. No. 536,755, Dec. 27, 1974, Pat. No. 3,963,748, which is a continuation-in-part of Ser. No. 266,695, June 27, 1972, abandoned, which is a division of Ser. No. 82,799, Oct. 21, 1970, Pat. No. 3,717,648, which is a continuation-in-part of Ser. No. 733,323, May 31, 1968, abandoned. This application Nov. 19, 1975, Ser. No. 633,443
Int. Cl.² C07D 211/00
U.S. Cl. 260—295 E **2 Claims**

1. A compound selected from 1-phenyl-3-(3,4,5,6-tetrahydro-2-pyridyl)urea, 1-(4-chlorophenyl)-3-(3,4,5,6-tetrahydro-2-pyridyl)urea and 1-(4-chlorophenyl)-3-(3,4,5,6-tetrahydro-6-phenyl-2-pyridyl)urea, and pharmaceutically acceptable acid-addition salts thereof.

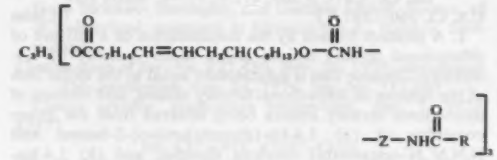
4,026,939

RADIATION-CURABLE COATING COMPOSITIONS AND INKS

Marvin Weiss, New Providence; Phillip Adams, Murray Hill; Gerald I. Nass, Secaucus, and Roland L. Leitner, Somerset, all of N.J., assignors to Millmaster Onyx Corporation, New York, N.Y.

Filed June 10, 1975, Ser. No. 585,615
Int. Cl.² C07C 69/52
U.S. Cl. 260—404.5 4 Claims

1. A polymerizable agent selected from the group consisting of the monomer and mixtures of such monomers wherein said monomer has the formula:



wherein Z is a divalent aromatic, alipha . or cycloaliphatic radical and R is an alkoxy group substituted by a plurality of α, β unsaturated low molecular weight acylate groups.

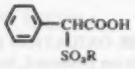
4,026,940

PROCESS FOR PRODUCING ALPHA-SULFOPHENYLACETIC ACID DERIVATIVES

Keiichi Sugimoto, Hyogo; Koji Nishijima, Osaka; Hiroshi Akimoto, Hyogo; Tadashi Hanaoka, Osaka, and Nobuharu Kakeya, Hyogo, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Division of Ser. No. 486,835, July 9, 1974, Pat. No. 3,954,826. This application Oct. 20, 1975, Ser. No. 624,285
Claims priority, application Japan, July 9, 1973, 48-77262; July 13, 1973, 48-79606; July 30, 1973, 48-85661
Int. Cl.² C07C 143/68
U.S. Cl. 260—456 P 11 Claims

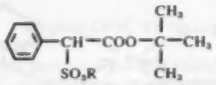
1. A method for producing α-sulfophenylacetic acid derivatives of the formula:



in which R is isobutyl or $-CH_2R'$ in which R' is a branched alkyl group of 4 to 14 carbon atoms, which comprises reacting α-chlorosulfonylphenylacetyl chloride with tertiary butanol at a temperature of −30° C to 30° C to produce an α-chlorosulfonylphenylacetic acid tertiary butyl ester; reacting the α-chlorosulfonylphenylacetic acid tertiary butyl ester with an alcohol of the formula:

R—OH

in which R has the same meaning as defined above at a temperature of −20° C to 40° C to produce a diester compound of the formula:



wherein R has the same meaning as defined above; and then bringing the diester compound into contact with a mineral acid in the absence of a solvent or in the presence of a solvent selected from the group consisting of dichloromethane, chloroform, carbon tetrachloride, benzene and toluene at a temperature of −30° C to 50° C.

4,026,941

POLYOXYALKYLATED POLYOL POLYESTERS HAVING IMPROVED ANTISTATIC PROPERTIES

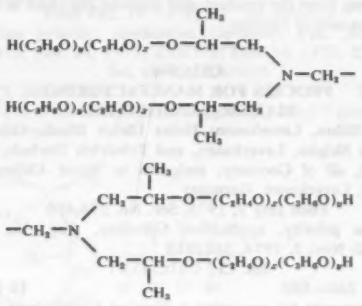
Robert Bernard Login, Woodhaven; Charles Francis Deck, Trenton, and Basil Thir, Grosse Ile, all of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Nov. 28, 1975, Ser. No. 635,933
Int. Cl.² C07C 69/34, 69/80, 69/82
U.S. Cl. 260—475 P 5 Claims

1. Polyoxyalkylated polyol polyesters prepared by the reaction at a temperature between 60° C. and 160° C. of an alkyl ester of a dicarboxylic acid represented by the formula:

R''OOC—R—COOR'

wherein R' and R'' are individually alkyl having from one to four carbon atoms or hydroxyalkyl having from two to four carbon atoms and R is the organic portion of a dicarboxylic acid selected from the group consisting of oxalic, malonic, succinic, glutaric, adipic, pimelic, suberic, azelaic, sebasic, phthalic, isophthalic, terephthalic and hydrogenated terephthalic with a polyol having the formula:



wherein x and y are integers such that the oxyethylene content of the polyol is between 10% and 90% by weight and the oxypropylene content of the polyol is between 90% and 10% by weight, employing an equivalent ratio of ester group to hydroxyl group of from about 0.25:1 to 0.5:1.

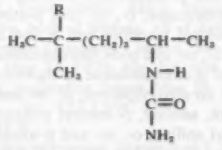
4,026,942

THERAPEUTICALLY EFFECTIVE N-SUBSTITUTED UREAS

Karl-Heinz Jaeger, Obereggenen; Hermann Kasparek, Oberkirch, Baden, both of Germany, and Willy Herbrand, deceased, late of Gengenbach, Baden, Germany (by Elisabeth Herbrand nee Lauterbach, heir), assignors to Solco Basel AG, Gengenbach, Baden, Germany

Continuation of Ser. No. 391,016, Aug. 23, 1973, abandoned, which is a division of Ser. No. 109,990, Jan. 26, 1971, abandoned. This application Aug. 25, 1975, Ser. No. 607,689
Int. Cl.² C07C 127/15; A61K 31/17
U.S. Cl. 260—553 R 3 Claims

1. A substituted urea having the formula



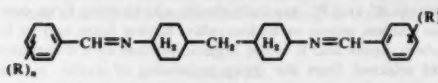
wherein R is hydrogen or a hydroxyl group.

4,026,943
NOVEL PROCESS

Reinhard H. Richter, North Haven, Conn., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Sept. 20, 1976, Ser. No. 724,584
Int. Cl.² C07C *87/32*
U.S. Cl. 260—563 B **8 Claims**

1. A process for enriching the trans,trans-isomer content of a mixture of stereoisomers of di-(p-aminocyclohexyl)methane which process comprises maintaining a mixture of (i) said mixture of stereoisomers and (ii) the trans,trans-isomer of a bis-benzaldimine of di-(p-aminocyclohexyl)methane of the formula:



wherein R is an inert substituent and *n* is an integer from 0 to 3, at a temperature within the range of about 15° C to about 60° C for a time sufficient to effect an increase in the trans,-trans-isomer content of said diamine; and

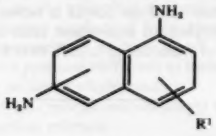
isolating from the product said diamine enriched in trans,-trans-isomer content.

4,026,944
PROCESS FOR MANUFACTURING DIAMINONAPHTHALENE

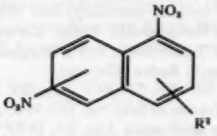
Walter Böhm, Leverkusen; Heinz Ulrich Blank, Odenthal; Guido Skipka, Leverkusen, and Friedrich Durholz, Remscheid, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed July 9, 1975, Ser. No. 594,490
Claims priority, application Germany, Aug. 10, 1974, 2438542; Nov. 2, 1974, 2452015
Int. Cl.² C07C *85/11*
U.S. Cl. 260—580 **16 Claims**

1. A process for preparing a diamino naphthalene having the formula



wherein R^1 is hydrogen or amino which comprises contacting a dinitro naphthalene having the formula



wherein R^2 is hydrogen nitro with hydrogen in the presence of a heterogeneous hydrogenation catalyst and an organic solvent selected from the group consisting of benzene, toluene,o-, m- and p-xylene, ethylbenzene, o-, m- and p-diethylbenzene, cumol, o-, m-, and p-diisopropylbenzene, 1,2,3-, 1,2,4- and 1,3,5-triisopropylbenzene, o-, m- and p-ethyl toluene, tetraline, α and Δ methyl tetraline and α and Δ ethyl tetraline, chlorobenzene, o-, m- and p-dichlorobenzene, a trichlorobenzene, o-, m- and p-chlorotoluene, a dichlorotoluene, phenol anisol, phenetol, an alkoxytoluene, o-, m- and p-chlorophenol, a dichlorophenol, analine, N-methyl anilene, a tri alkyl aniline, a tetra alkyl aniline, o-, m- and p-toluidine a xylidine, a diamino toluene, phenetidine and anisidine, the amount of solvent being present such that there results a 5 to 40% by weight solution or suspension of said dintro naphthalene compound.

4,026,945
ANTI-MICROBIAL QUATERNARY AMMONIUM CO-POLYMERS

Harold A. Green, Havertown, Pa.; John J. Merianos, Jersey City, and Alfonso N. Petrocci, Glen Rock, both of N.J., assignors to Millmaster Onyx Corporation, New York, N.Y.

Division of Ser. No. 511,759, Oct. 3, 1974, Pat. No. 3,928,323, which is a continuation-in-part of Ser. No. 425,931, Dec. 18, 1973, Pat. No. 3,874,870. This application July 7, 1975, Ser. No. 593,737
Int. Cl.² C07C *85/00, 87/30, 87/46;* A01N *9/20*
U.S. Cl. 260—567.6 P **1 Claim**

1. A product formed by the condensation of a mixture of difunctional tertiary amines and a molar quantity of 1,4-dichloro-2-butene that is substantially equal to the molar sum of the mixture of difunctional tertiary amines, said mixture of difunctional tertiary amines being selected from the group consisting of (*a*) 1,4-bis-(dimethylamino)-2-butene and N,N,N′,N′-tetramethyl ethylene diamine, and (*b*) 1,4-bis-(dimethylamino)-2-butene and 1,4-bis-(methyl dodecylamino)-2-butene, the components of each mixture being present in a molar proportion of between 10% and 90% of the mixture.

4,026,946
HALOGEN DERIVATIVES OF ALKYNOXYMETHYL AMINES

Patrick M. Quinlan, Webster Groves, Mo., assignor to Petrolite Corporation, St. Louis, Mo.

Filed Mar. 7, 1975, Ser. No. 556,332
Int. Cl.² C07C *93/10, 93/08, 93/12;* C23F *11/00*
U.S. Cl. 260—584 C **5 Claims**

1. A compound having the formula

$$RN(CH_2OR'C \equiv CX)_2$$

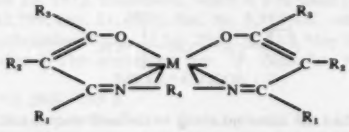
where R is a hyrocarbon group, R′ is an alkylene group having up to 8 carbon atoms and X is a halogen selected from the group consisting of chlorine, bromine and iodine.

4,026,947
PROCESS FOR THE OXIDATION OF β-ISOPHORONE

Michel Costantini; Adrien Dromard, both of Lyon, and Michel Jouffret, Francheville, all of France, assignors to Rhone-Poulenc Industries, Paris, France

Filed Feb. 23, 1976, Ser. No. 660,721
Claims priority, application France, Nov. 3, 1975, 75.07557
Int. Cl.² C07C *45/00*
U.S. Cl. 260—586 P **16 Claims**

1. A process for the preparation of 3,5,5-trimethylcyclohex-2-ene-1,4-dione by oxidation of β-isophorone, which comprises oxidizing the β-isophorone with molecular oxygen or a gas containing molecular oxygen, in a liquid organic solvent medium in the presence of an alkylamine and a chelate of the general formula:



(I)

in which:

M represents cobalt or manganese,

R_1, R_2 and R_3, which may be identical or different, each represents a hydrogen atom or an alkyl radical containing

1 to 4 carbon atoms; or R_2 and R_3, together with the 2 carbon atoms of the double bond, form a benzene ring carrying one or more hydrogen or halogen atoms, nitro groups, alkyl radicals containing 1 to 4 carbon atoms or alkoxy radicals containing 1 to 4 carbon atoms, and

R_4 represents a divalent hydrocarbon radical containing 2 to 15 carbon atoms or an alkyl chain interrupted by one or more heteroatoms and containing from 4 to 10 carbon atoms.

4,026,948

PROCESS FOR THE PREPARATION OF 2,2,6-TRIMETHYL-CYCLOHEX-5-EN-1,4-DIONE

Joseph J. Becker, Geneva; Karl-Heinrich Schulte-Elte, Onex; Hugo Strickler, Dardagny, and Günther Ohloff, Bernex, all of Switzerland, assignors to Firmenich S.A., Geneva, Switzerland

Continuation of Ser. No. 527,450, Nov. 26, 1974, abandoned. This application Aug. 24, 1976, Ser. No. 717,209

Claims priority, application Switzerland, Dec. 7, 1973, 17172

Int. Cl.² C07C 45/00, 45/04

U.S. Cl. 260—586 P 3 Claims

1. Process for the preparation of 2,2,6-trimethyl-cyclohex-5-en-1-4-dione which comprises oxidizing, in the liquid phase, 3,3,5-trimethyl-cyclohex-4-en-1-one by means of oxygen or an oxygen containing gas mixture, in the presence of a metal catalyst essentially consisting of a member selected from the group consisting of acetate of manganese^{II}, manganese^{III} of a cobalt^{III}, or an acetylacetonate of cobalt^{II}, of chromium^{III}, of vanadium^{III}, of nickel^{II}or of copper^{II}.

4,026,949

OPTICALLY ACTIVE CYCLOHEXANE DERIVATIVES

Walter Boguth, Riehen; Hans Georg Wilhelm Leuenberger, Ariesheim; Hans Johann Mayer, Fullinsdorf; Erich Widmer, Munchenstein, and Reinhard Zell, Rodersdorf, all of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

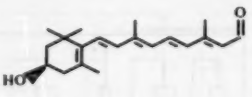
Division of Ser. No. 601,770, Aug. 4, 1975, Pat. No. 3,988,205. This application July 20, 1976, Ser. No. 707,128

Claims priority, application Switzerland, Aug. 21, 1974, 11434/74; Nov. 1, 1974, 14674/74

Int. Cl.² C07C 47/46

U.S. Cl. 260—598 1 Claim

1. A compound of the formula



4,026,950

PROCESS FOR THE PREPARATION OF HYDROXYBENZALDEHYDES

Joel Le Ludec, Lyon, France, assignor to Rhone-Poulenc Industries, Paris, France

Filed Mar. 8, 1976, Ser. No. 664,675

Claims priority, application France, Mar. 28, 1975, 75.09932

Int. Cl.² C07C 45/16

U.S. Cl. 260—600 R 11 Claims

1. In a process for the preparation of salicylaldehyde which comprises liquid phase oxidation of ortho-hydroxybenzyl alcohol with molecular oxygen or of a gas containing molecular oxygen in an aqueous, alkaline medium, in the presence of a platinum or palladium catalyst, the improvement wherein an organic or inorganic derivative of bismuth, in which the bismuth is at an oxidation level greater than zero, is present as a co-catalyst.

4,026,951

PROCESS FOR THE PRODUCTION OF ANETHOLE

Kurt [illegible]auer, Holzminden, and Reiner Mölleken, Golmbach Ortsteil Warbsen, both of Germany, assignors to Haarmann & Reimer GmbH, Holzminden, Germany

Filed Apr. 14, 1975, Ser. No. 568,091

Claims priority, application Germany, Apr. 19, 1974, 2418974

Int. Cl.² C07C 41/00

U.S. Cl. 260—612 D 9 Claims

1. A process for the production of anethole which comprises splitting 1,1-(dimethoxyphenyl) propane by heating at a temperature in the range from 100° to 300 ° C in the presence of an acid catalyst for the splitting, to form said anethole and recovering said anethol.

4,026,952

4-(M,M'-DI-T-BUTYL-P-HYDROXYPHENYL) BUTYL-2 COMPOUNDS

Roman Fischer, Mutterstadt; Werner Fliege, Otterstadt; Wolfgang Keernig, Mannheim, and Peter Horn, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

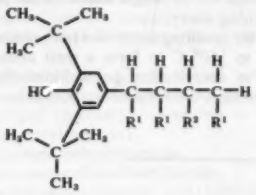
Filed Feb. 19, 1974, Ser. No. 443,822

Claims priority, application Germany, Feb. 24, 1973, 2309375; Feb. 24, 1973, 2309376; Feb. 24, 1973, 2309377

Int. Cl.² C07C 39/06

U.S. Cl. 260—624 R 2 Claims

1. 4-(m,m'-di-t-butyl-p-hydroxyphenyl)-butyl-2 compounds of the formula:



I.

in which the radicals R^1 are the same or different and each denotes hydrogen or alkyl of 1 to 4 carbon atoms, and R^2 denotes hydroxyl.

4,026,953

SOLVENTS FOR NMR SPECTROSCOPY

Ludwig Pohl; Werner Theysohn, and Richard Unger, all of Darmstadt, Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Germany

Division of Ser. No. 410,280, Oct. 26, 1973, Pat. No. 3,954,410. This application Oct. 24, 1975, Ser. No. 625,549

Claims priority, application Germany, Nov. 21, 1972, 2257005

Int. Cl.² C07C 31/04, 31/08

U.S. Cl. 260—632 R 5 Claims

1. An at least partially deuterated methanol or ethanol having a carbon-13 content of not more than 0.2 atom percent.

4,026,954

METHOD FOR PREPARING HEXYN-3-OL-1

Kenichi Taguchi, Tokorozawa; Akira Yamamoto, and Toshinobu Ishihara, both of Niigata, all of Japan, assignors to Shin-Etsu Chemical Company Limited, Tokyo, Japan

Filed May 24, 1976, Ser. No. 688,976

Claims priority, application Japan, May 26, 1975, 50-62624

Int. Cl.² C07C 29/00

U.S. Cl. 260—632 B 10 Claims

1. A method for preparing hexyn-3-ol-1 comprising the steps of:

1. reaction of a methyl magnesium halide with propargyl chloride, to form an ethylacetylene magnesium halide,
2. addition reaction of the ethylacetylene magnesium halide with ethylene exide, to form a halogenomagnesium salt of hexyn-3-ol-1, and
3. hydrolysis of the haloganomagnesium salt of hexyn-3-ol-1.

4,026,955

PREPARATION OF PENTACHLORONITROBENZENE

Paul W. Breaux, Cleveland; Wendell D. Newman, Delano, and Philip E. Quinnett, Cleveland, all of Tenn., assignors to Olin Corporation, New Haven, Conn.

Filed May 4, 1976, Ser. No. 683,437
Int. Cl.² C07C 79/12
U.S. Cl. 260—646 7 Claims

1. A process for preparing pentachloronitrobenzene having reduced hexachlorobenzene content comprising the steps of:
1. mixing together at an initial reaction temperature in the range of 100°–120° C pentachlorobenzene and a mixed nitration acid consisting essentially of sulfuric and excess nitric acid,
2. Heating the resulting reaction mixture to an intermediate temperature in the range of 130° C up to the melt point of pentachloronitrobenzene and maintaining the reaction mixture at a temperature in said range for a period sufficient to deplete the nitric acid concentration thereof to a value of not more than 1% by weight based on the liquid fraction of the resulting slurry,
3. Thereafter heating the resulting slurry to a temperature in the range of 142° to 160° C to form a melt and then cooling the melt to recrystallize pentachlorobenzene containing not more than 0.6% hexachlorobenzene.

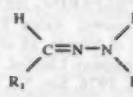
4,026,956

STORAGE STABILIZED METHYLCHLOROFORM FORMULATIONS

James A. Manner, Akron, Ohio, assignor to PPG Industries, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 288,821, Sept. 13, 1972, abandoned, which is a continuation-in-part of Ser. No. 16,217, March 4, 1970, abandoned, which is a continuation-in-part of Ser. No. 822,706, May 7, 1969, Pat. No. 3,532,761. This application June 11, 1975, Ser. No. 585,989
Int. Cl.² C07C 17/40, 17/42
U.S. Cl. 260—652.5 R 23 Claims

1. In a methylchloroform formulation comprising a metal-induced decomposition stabilizing concentration of an additive selected from the group of 1,3-dioxolanes; 1,4-dioxane or mixtures thereof; wherein the improvement comprises a formulation containing a stabilizing concentration of aliphatic aldehyde hydrazone of up to 7 carbon atoms having the formula:



wherein R_1, R_2, and R_3 each are either hydrogen or an alkyl group containing 1 to 4 carbon atoms, to storage-stabilize and substantially minimize the formation of peroxides or acids developed by the presence of said additive.

4,026,957

SYMMETRICAL CONJUGATED DIENE AND POLYENE SYNTHESIS VIA VINYLMERCURIC SALTS

Richard Craig Larock, Ames, Iowa, assignor to Iowa State University Research Foundation, Inc., Ames, Iowa

Filed Apr. 30, 1976, Ser. No. 681,783
Int. Cl.² C07C 1/00
U.S. Cl. 260—666 A 14 Claims

1. A method of preparing symmetrical conjugated hydrocarbyl dienes, said method comprising, reacting a hydrocarbyl vinylmercuric compound, with a palladium (II) dimerization promoting agent, said reaction being conducted in a polar organic solvent and in the presence of an additional source of halide ions.

4,026,958

CATALYST FOR DEHYDROGENATION OR DEHYDROCYCLIZATION OF HYDROCARBONS

Vladimir Mikhailovich Gryaznov, Leninskie Gory MGU, korpus L. kv. II; Viktoria Petrovna Polyakova, ulitsa Trofimova 15, kv. 201; Evgeny Mikhailovich Savitsky, ulitsa Dm.Ulyanova D.N.R. 3, kv. 13, and Evgenia Vladimirovna Khrapova, Nizhegorodskaya ulitsa, II"b", kv. 47, all of Moscow, U.S.S.R.

Continuation of Ser. No. 179,585, Sept. 10, 1971, abandoned, which is a division of Ser. No. 874,080, Nov. 4, 1969, abandoned. This application Mar. 5, 1976, Ser. No. 664,412
Int. Cl.² C07C 5/18
U.S. Cl. 260—668 D 4 Claims

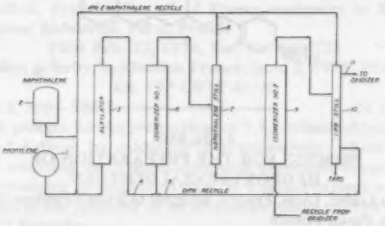
1. A process for the dehydrogenation of cyclohexane to benzene which comprises passing the cyclohexane in vapor form at a temperature of about 330° C to about 575° C over a catalyst comprising a membrane of an alloy consisting of 90 to 98% by weight of palladium and 2 to 10% by weight of ruthenium.

4,026,959

LOW TEMPERATURE ISOMERIZATION PROCESS FOR ISOPROPYLNAPHTHALENE (100 PERCENT SIEVE CATALYST)

Herbert Rudolph Kemme, Flemington, and James Frederick Russ, North Brunswick, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed May 7, 1976, Ser. No. 684,214
Int. Cl.² C07C 5/28, 15/24
U.S. Cl. 260—668 A 8 Claims



1. A process for increasing the beta-isopropylnaphthalene content of a mixture containing essentially naphthalene, alpha- and beta-isopropylnaphthalene and diisopropylnaphthalene, which comprises contacting said mixture with a diluted rare earth metal ammonium-exchanged, synthetic, crystalline "Y" type allumino-silicate catalyst at a temperature of from about 150° C to 260° C., with a space velocity of from about 0.1 to 4 hour^{-1}, at a gauge pressure of from about 200 psi to 500 psi, said mixture having about 1 to 10 equivalents naphthalene per equivalent of propylene, removing residual naphthalene from the reaction product, and further contacting the

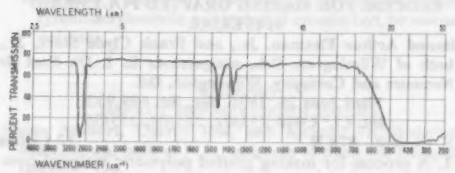
naphthalene-free product with a rare earth metal ammonium-exchanged, 100% synthetic, crystalline "Y" type aluminosilicate catalyst at a temperature of from about 70° C. to 175° C., at substantially atmospheric pressure, and recovering the product therefrom.

4,026,960

2,7,10,15,18,23-HEXAMETHYLTETRA-COSANE

Takashi Nishida; Yoichi Ninagawa; Kazuo Itoi, all of Kurashiki; Yoshiaki Omura, Okayama; Yoshin Tamai, Kurashiki; Takeo Hosogai, Kiyone, and Yoshiji Fujita, Kurashiki, all of Japan, assignors to Kuraray Co., Ltd., Kurashiki, Japan

Filed July 9, 1974, Ser. No. 486,782
Claims priority, application Japan, July 6, 1973, 48-76875
Int. Cl.² C07C *9/16*
U.S. Cl. 260—676 R 1 Claim



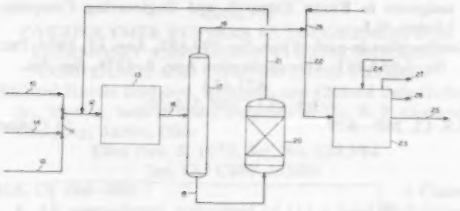
1. A compound 2,7,10,15,18,23-hexamethyltetracosane.

4,026,961

ISOPARAFFIN HF ALKYLATION WITH LOW-BOILING ALKYL FLUORIDE-CONTAINING FRACTION

Thomas Hutson, Jr., Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Sept. 15, 1975, Ser. No. 613,763
Int. Cl.² C07C *3/54*
U.S. Cl. 260—683.49 10 Claims



7. In a process for the alkylation of isoparaffinic hydrocarbons wherein olefins are reacted with HF under hydrofluorination conditions in a first stage and alkyl fluorides are reacted with isoparaffins in a second stage under alkylation conditions and in the presence of HF, the improvement which comprises the steps of

a. distilling the alkyl fluorides produced in said first stage under conditions to separate a low boiling fraction comprising alkyl fluorides and hydrocarbons boiling in the range of about 10° to about 140° F. and a high boiling fraction comprising alkyl fluorides and hydrocarbons boiling above about 140° F., and

b. passing said low boiling fraction as said alkyl fluorides to said second stage.

4,026,962

DISPERSION-POLYMERIZATION PROCESS USING BLOCK COPOLYMERS

Morand Lambla, Hoenheim, and Jean Terrisse, Pont a Mousson, both of France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), Nueilly sur Seine, France

Filed May 2, 1975, Ser. No. 573,836
Claims priority, application France, May 7, 1974, 74.15802
Int. Cl.² C08L *53/00, 83/10*
U.S. Cl. 260—827 10 Claims

1. A process for the free-radical polymerization of vinyl monomers, suspended in water, comprising the steps of: dispersing a block copolymer of the A-B type selected from the group consisting of:

polystyrene-quaternized poly(vinyl-2-pyridine),
polystyrene-quaternized poly(vinyl-3-pyridine),
polystyrene-quaternized poly(methyl-2 vinyl-5 pyridine)
polystyrene-anhydrated and hydrolyzed or salified polyisoprene,
polystyrene-quaternized amidated polyisoprene,
polystyrene-poly(dimethylaminoethyl methacrylate)
polystyrene-quaternized poly(dimethylaminoethylmethacrylate),
polystyrene-hydrolyzed and/or salified poly(trimethylsilyl methacrylate),
polyisoprene-quaternized poly(vinyl-2-pyridine),
polyisoprene-quaternized poly(vinyl-4-pyridine),
poly(hexyl methacrylate)-poly(dimethylaminoethyl)methacrylate,
poly(heptyl methacrylate)-poly(dimethylaminoethyl methacrylate),
polydimethylsiloxane-quaternized poly(vinyl-2-pyridine),
polydimethylsiloxane-quaternized poly(vinyl-4-pyridine),
polydimethylsiloxane-poly(dimethylaminoethyl methacrylate),
polydimethylsiloxane anhydrated, and hydrolyzed or hydrolysed and salified anhydrated polyisoprene,
poly(vinyl chloride), hydrolyzed or hydrolysed and salified poly(vinyl acetate),
polystyrene-polyacrylamide,
polystyrene-polymethacrylamide,
polystyrene-poly(acrylic acid) salified or not,
polystyrene-polyvinylpyrrolidone,
polystyrene-poly(styrene sulfonic acid),

wherein A represents a lipophilic polymer block and B represents blocks A and B of said block copolymer are present in a respective molecular weight ratio of about 0.1 to 10; adding at least one vinyl monomer to be polymerized and containing a polymerization promoter to said dispersion, wherein the amount of block copolymer ranges from 0.05–5.0 parts by weight per thousand parts by weight of vinyl monomer; and heating the mixture with stirring to the desired polymerization temperature.

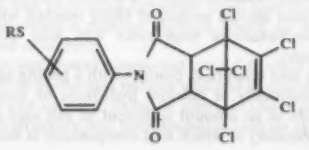
4,026,963

N-(O OR o-THIOPHENYL) SUBSTITUTED POLYHALO-5-NORBORNENE-2,3,-DICARBOXIMIDE FLAME RETARDANTS AND POLYMERS CONTAINING SAID IMIDES

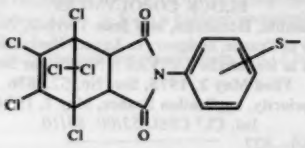
Yong Sung Rim, Cheshire, and Walter Nudenberg, Newtown, both of Conn., assignors to Uniroyal Inc., New York, N.Y.

Filed Aug. 21, 1975, Ser. No. 606,689
Int. Cl.² C08K *5/37;* C07D *209/34;* C08K *5/36*
U.S. Cl. 260—859 R 9 Claims

1. A compound having the formula:



wherein R is H or



and RS— is in the ortho- or the para- position.

6. A flame retardant polymeric composition comprising a polyurethane elastoplastic, from about 5 to about 50% by weight, based on the total composition, of a compound of claim 1 and from about 5 to about 50% by weight, based on the total composition, of chlorinated polyethylene.

4,026,964

HALOPHENOXYPHOSPHAZENE FIRE RETARDANTS AND POLYESTERS CONTAINING SAME

Charles H. Kolich, Northville; Henry G. Braxton, Jr., Franklin, and Urho A. Lehikoinen, Detroit, all of Mich., assignors to Ethyl Corporation, Richmond, Va.

Division of Ser. No. 525,932, Nov. 21, 1974, Pat. No. 3,996,312. This application Sept. 15, 1976, Ser. No. 723,552

Int. Cl.² C07D 9/06; C08K 5/53; C08L 31/06

U.S. Cl. 260—860 6 Claims

1. As a composition of matter, polyester stabilized with a fire retardant amount of a reaction product of a phosphonitrilic halide and a halogenated monohydroxyaromatic compound crosslinked by a P—O—P bond, said reaction product being prepared by a process a process comprising:

a. reacting a phosphonitrilic chloride with a sodium salt of a monohydroxy halogenated phenol, the amount of said salt being less than that required to react with all the chlorine atoms in said phosphonitrilic chloride, said amount of said salt being from about 1 to about 0.5 theory,

b. reacting the product thereby produced with a lower sodium alkoxide such that residual chlorine remains in the intermediate thereby produced, the amount of said lower alkoxide being enough to theoretically react with all of the remaining chlorine atoms in said phosphonitrilic chloride, and

c. heating said product thereby produced to a temperature of 120°–220° C for 0.5–48 hours.

4,026,965

UNSATURATED POLYESTER WITH THERMOPLASTIC GRAFTS USING CALCIUM HYDROXIDE AS GELLING AGENT

Michael G. Roberts, Heath, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Division of Ser. No. 502,690, Sept. 3, 1974, Pat. No. 3,992,479. This application Aug. 27, 1976, Ser. No. 718,248

Int. Cl.² C08L 67/06, 9/04, 9/08

U.S. Cl. 260—862 9 Claims

1. A method of producing a molded composition comprising:

a. forming a mixture of an unsaturated, crosslinkable thermosetting resin, an ethlenically unsaturated first monomer and a thermoplastic resin soluble in said first monomer, said thermoplastic resin comprising the reaction product of a second monomer with a mixture comprising a styrene-butadiene copolymer and a polybutadiene polymer, said second monomer being reacted with both said styrene-butadiene copolymer and said polybutadiene polymer;

b. aging said mixture in contact with a gelling agent consisting essentially of calcium hydroxide or magnesium hydroxide in an amount sufficient to gell said composition to a viscosity at which said composition is moldable, and,

c. molding said mixture to produce a molded composition.

4,026,966

PREPARATION OF MODIFIED ELASTOMERS

Francis P. Baldwin, Summit, N.J., and Alberto Malatesta, Brussels, Belgium, assignors to Exxon Research and Engineering Company, Linden, N.J.

Continuation of Ser. No. 530,613, Dec. 9, 1974. This application May 15, 1975, Ser. No. 577,994

Int. Cl.² C08F 255/06

U.S. Cl. 260—878 R 8 Claims

1. A method of crosslinking an elastomer containing randomly distributed sites of conjugated olefinic unsaturation, which comprises: reacting said elastomer with a crosslinking agent comprising at least one nongaseous, soluble, free radical polymerizable monomer, in the presence of at least one free radical initiator wherein the elastomer is a terpolymer of ethylene, a C_3 to C_{10} alpha olefin, and a 5,6-dimethylene-2-norbornene.

4,026,967

PROCESS FOR MAKING GRAFTED POLYMERIC MATERIAL

Edmund Arthur Flexman, Jr., and Frank Clyde Starr, Jr., both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed June 25, 1976, Ser. No. 699,932

Int. Cl.² C08F 255/02, 255/04, 255/06

U.S. Cl. 260—878 R 12 Claims

1. A process for making grafted polymeric material comprising the steps of:

a. mixing a backbone polymer and a graft monomer;

b. introducing the mixture into a tubular reactor device exhibiting dispersed plug-flow character;

c. raising the temperature of the mixture to from 275° to 550° centigrade;

d. conducting the mixture through the tubular reactor in a time adequate to accomplish a grafting reaction and less than necessary for excessive degradation, maintaining the temperature of step (c) for from ten to one-quarter minutes to yield grafted polymeric material.

4,026,968

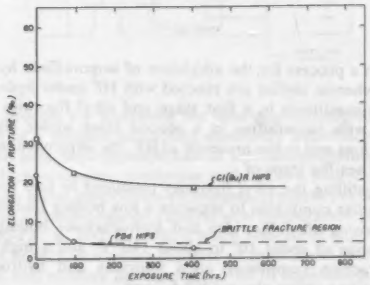
BROMOBUTYL RUBBER-STYRENE-ACRYLONITRILE GRAFT COPOLYMERS

Burnett H. Johnson, and Terrence Huff, both of Baytown, Tex., assignors to Exxon Research and Engineering Company, Linden, N.J.

Continuation-in-part of Ser. No. 497,688, Aug. 15, 1974, Pat. No. 3,954,911. This application Apr. 5, 1976, Ser. No. 673,453

Int. Cl.² C08F 255/10

U.S. Cl. 260—879 14 Claims



1. A graft copolymer comprising as the matrix a polymer of

styrene or a copolmyer of styrene and acrylonitrile and grafted thereto a crosslinked, brominated polymer consisting essentially of isobutylene and 1 to 3 weight percent isoprene and having about one atom of bromine per double bond of uncrosslinked polymer, prepared by the process comprising:

crosslinking a brominated polymer consisting essentially of isobutylene and 1 to 3 weight percent isoprene and having about one atom of bromine per double bond of uncrosslinked polymer,

imbibing into said crosslinked polymer, styrene or a mixture of styrene and acrylonitrile, containing from about 50 to 80 weight percent styrene, to form a gel,

dispersing said gel to a particle size wherein the crosslinked brominated polymer phase in said graft copolymer is less than 10μ diameter,

suspending said gel in water,

polymerizing said styrene or mixture of styrene and acrylonitrile in the presence of a free radical catalyst, at a temperature in the range of 50° to 150° C., said crosslinked, brominated polymer being present in an amount of from 2 to 30 weight percent based on total styrene or mixture of styrene and acrylonitrile present in said suspension, and

recovering a solid graft copolymer of polystyrene or polystyrene-acrylonitrile and included crosslinked, brominated polymer.

4,026,969

IMPACT IMPROVED POLYMERS

Simon Mostert, Cherry Hill, and Richard O. Whitehead, Moorestown, both of N.J., assignors to Shell Oil Company, Houston, Tex.

Continuation of Ser. No. 524,119, Nov. 15, 1974, abandoned, which is a continuation-in-part of Ser. No. 388,512, Aug. 15, 1973, which is a continuation-in-part of Ser. No. 193,705, Oct. 29, 1971, abandoned. This application Nov. 12, 1975, Ser. No. 631,352

Int. Cl.² C08L *9/06*

U.S. Cl. 260—880 R **12 Claims**

1. A graft copolymer composition having a toluene insoluble gel/total rubber weight ratio in the range of from about 1.65 to about 0.39 and a rubber utilization of from about 21 to about 65, consisting essentially of from about 4 to 12 parts by weight of a mixture of (1) polybutadiene elastomer and (2) polyisoprene elastomer in a weight ratio of (1) to (2) between 35:65 and 65:35 and from about 96 to about 88 parts by weight of polymerized styrene.

4,026,970

OVERPOLYMER RUBBERS AS TOUGHENERS FOR THERMOSET AND THERMOPLASTIC MOLDING COMPOUNDS AND COMPOSITIONS THEREOF

Richard Harold Backderf, Richfield, and Clifford Dale Gulley, Jr., Medina, both of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio

Filed Nov. 5, 1975, Ser. No. 628,994

Int. Cl.² C08F *265/08*

U.S. Cl. 260—881 **6 Claims**

1. An overpolymer comprised of (1) a hard graft-linked core having a Tg value of over about 20° C. and comprised of interpolymerized unit of from about 50 percent to about 80 percent by weight of acrylonitrile, from about 19 percent to about 40 percent by weight of an acrylate monomer(s) of the formula

$$CH_2{=}C(R)-CO-R'$$

wherein R is hydrogen, methyl, or ethyl, and R′ is an alkyl radical containing 1 to about 24 carbon atoms or an alkoxyalkyl, alkylthioalkyl, or cyanoalkyl radical containing a total of 1 to about 12 carbon atoms in the radical and from about 0.1 percent to about 10 percent by weight of a graft-linking monomer which is a vinyl or allyl ester of a member selected from the group consisting of an unsaturated acid, unsaturated acid anhydride, and an unsaturated amide each of which contains from 3 to about 10 carbon atoms (2) a cross-linked rubbery shell having a Tg value of below about 0° C. containing from about 0.1 percent to about 10 percent by weight based on the total weight of the shell of a crosslinking monomer wherein the shell contains interpolymerized units of from about 90 percent to about 99.9 percent by weight based on the total weight of the shell of interpolymerized units of a mixture of a major amount of an acrylate monomer of the formula

$$CH_2{=}C(R)-CO-R'$$

wherein R and R′ are defined as above, with a minor amount of an unsaturated carboxylic acid containing 3 to about 8 carbon atoms, and the crosslinking monomer is selected from the group consisting of divinyl cyclic hydrocarbons, monomeric polyesters of a polyhydric alcohol containing 2 to about 10 carbon atoms with acrylic or methacrylic acid, and monomeric polyalkenyl polyethers of a polyhydric alcohol containing 2 to about 10 carbon atoms, and (3) a hard overcoat having a Tg value of over about 20° C.; said core, shell, and overcoat present in a weight ratio of from about 1:0.7 to 5.0:0.4 to 4.0 based on the core.

4,026,971

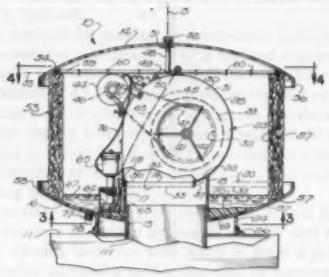
EVAPORATIVE COOLER

Ronald M. Glasoe, 840 Hamilton Lane, Escondido, Calif. 92025

Filed July 25, 1975, Ser. No. 599,180

Int. Cl.² B60H *1/26;* **F24F** *7/06*

U.S. Cl. 261—29 **6 Claims**



1. An evaporative cooler comprising:

an evaporation pad structure curving essentially circularly and cylindrically about an essentially vertical axis and defining an essentially cylindrical chamber into which air flows through said pad structure from the outside thereof;

an upper wall extending across the top of said chamber;

an essentially circular lower wall extending inwardly from the lower edge of said pad structure and defining the bottom of said chamber and containing a central air discharge opening;

an essentially vertical air discharge conduit connected to said lower wall about said opening in fluid tight sealed relation and projecting upwardly from said bottom wall and containing a passage through which air discharges from said chamber;

a motor driven blower connected to said conduit at a location spaced above said bottom wall and supported by said conduit and acting to draw air into said chamber through said pad structure and then discharge said air and carried

moisture from the pad structure downwardly through said air discharge conduit;

said lower wall in extending inwardly from said pad structure to said conduit being of essentially annular downwardly convex configuration to progressively advance downwardly as it advances inwardly toward said conduit, and forming a water accumulation sump extending about and closely adjacent said conduit but isolated from the air flowing within the conduit;

means for pumping water from said accumulation sump to an upper portion of said pad structure, and including a pump taking suction from said accumulation sump; and

means at the upper side of said lower wall forming an upper surface on which water in said sump rests and which is lower at the location of the suction of said pump than at other locations spaced circularly therefrom.

4,026,972

METHOD OF TERMINATING OPTICAL FIBERS

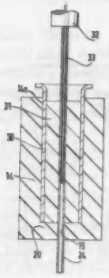
Michael J. Phillips, Stanstead, and Aubrey M. Crick, Epping, both of England, assignors to International Standard Electric Corporation, New York, N.Y.

Filed Apr. 1, 1976, Ser. No. 672,650

Claims priority, application United Kingdom, May 6, 1975, 18929/75

Int. Cl.² B29D *11/00*

U.S. Cl. 264—1 **5 Claims**



1. A method of making a sheathed optical fiber termination comprising a hollow cylindrical ferrule through which an optical fiber is threaded with its sheathing terminating within the ferrule and in which ferrule the fiber is secured to lie with its unsheathed end section on axis at one end thereof, comprising the steps of:

providing a circularly symmetrical elastomeric jig having a smaller hole dimensioned to receive the unsheathed end section of the fiber and a larger axial hole dimensioned to receive the ferrule;

mounting the ferrule in the larger hole and the unsheathed end section of the fiber in the smaller hole;

causing the sidewalls of the longer and smaller holes, respectively, to grip the ferrule and unsheathed end section of the fiber;

filling the ferrule with a potting compound either before or after mounting the unsheathed end section of the fiber in the smaller hole; and

allowing the potting compound to cure.

4,026,973

PROCESS FOR PREPARING HEAT-RESISTANT AROMATIC POLYESTER FILAMENTS

Takeo Shima; Seiichi Yamashiro; Masao Yoshimura; Takayuki Kobayashi; Takatoshi Kuratsuji, and Hiroo Inata, all of Iwakuni, Japan, assignors to Teijin Limited, Osaka, Japan

Continuation of Ser. No. 393,300, Aug. 31, 1973, abandoned, which is a division of Ser. No. 170,312, Aug. 9, 1971, abandoned. This application Aug. 1, 1975, Ser. No. 601,232

Int. Cl.² B29C *25/00*

U.S. Cl. 264—235 **11 Claims**

1. A process for the preparation of heat-resistant polyethylene-2,6-naphthalate filaments which comprises subjecting stretched polyethylene-2,6-naphthalate filaments having a birefringence of at least 0.27, an intrinsic viscosity ranging from 0.35 and 1.0, and being composed of at least 90 mol% of ethylene-2,6-naphthalene structural units, to a first post heat treatment at constant length and at temperatures of 160° C. to below 250° C., and then subjecting the filaments to a second post heat treatment wherein elongation or shrinkage is not greater than 5% and at temperatures ranging from 250° C. to 290° C. and having from one to four heating stages, such that the thermal energy vlaue (E) for each particular heating stage satisfies the equation

$$E = t \times 4.3^{(T-250)/10}$$

wherein t is the time of the particular heating stage in hours and T is the temperature of the particular heating stage in °C., with the proviso that the sum of the thermal energy values for all of the heating stages (ΣE) is at least one.

4,026,974

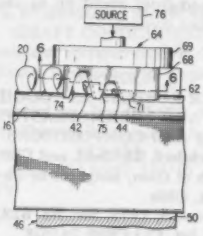
METHOD FOR FORMING SLIDE FASTENERS

George B. Moertel, Conneautville, and James R. Wilson, Conneaut Lake, both of Pa., assignors to Textron, Inc., Providence, R.I.

Division of Ser. No. 220,296, Jan. 24, 1972, Pat. No. 3,735,469, which is a division of Ser. No. 34,340, May 4, 1970, Pat. No. 3,672,008. This application Mar. 20, 1973, Ser. No. 343,092

Int. Cl.² B29D *5/00*

U.S. Cl. 264—23 **13 Claims**



1. A method of forming a top portion for a slide fastener of the type having a tape carrying fastener elements made of a continuous filament of deformable material, said method comprising the steps of

supporting the slide fastener in a position such that terminal elements of the fastener elements are exposed;

reducing the size of the terminal elements relative to the remainder of the fastener elements including reducing the size of an end fastener element and the fastener element adjacent thereto such that the adjacent fastener element is reduced in size relative to the remainder of the fastener elements and the end fastener element is reduced in size relative to the adjacent fastener element; and

fusing a mass of fusible material to the tape adjacent the

reduced terminal elements to form a top stop for the slide fastener.

4,026,975

RADIALLY ANISOTROPIC MAGNET BODY

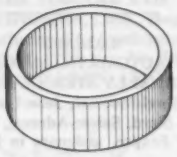
Franciscus Xaverius Nicolaus Maria Kools, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Division of Ser. No. 507,366, Sept. 18, 1974, abandoned. This application Jan. 14, 1976, Ser. No. 648,969

Claims priority, application Netherlands, Sept. 26, 1973, 7313231

Int. Cl.² C04B *33/32*

U.S. Cl. 264—24 **1 Claim**



1. A method of manufacturing an annular, radially anisotropic, permanently magnetizable body having an inner diameter which is at least 0.8 times the outer diameter substantially free of cracks and consisting essentially of a material of the formula $MeO.6Fe_2O_3$, wherein Me is at least one of the metals barium, strontium and lead comprising the steps of molding a powder consisting of said material into an annular body having an internal diameter at least 0.8 times the outer diameter while in a radial magnetic field, hydrostatically compression said body to increase the density thereof, thereafter heating said body to a temperature of about 1250° C to form a highly-coherent body, and cooling said body to ambient temperature at about 40° C/hour.

4,026,976

SEALING LEAKS WITH POLYMERIZED MONOMERS

Amos R. Anderson, Adrian, Mich., assignor to American National Bank & Trust Company of Fort Lauderdale, Trustee, Fort Lauderdale, Fla.

Continuation of Ser. No. 302,877, Nov. 1, 1972, abandoned, which is a continuation-in-part of Ser. No. 96,619, Dec. 7, 1970, abandoned. This application Dec. 16, 1974, Ser. No. 533,431

Int. Cl.² B29C *23/00;* **B23P** *7/00*

U.S. Cl. 264—36 **17 Claims**

1. A method of forming a seal at the situs of a leak located in a vessel by polymerizing an organic monomer said monomer being capable of being polymerized into an organic polymer seal, comprising introducing into the interior of said vessel said polymerizable organic monomer in gaseous state and introducing into said vessel a polymerization catalyst for said monomer in the gaseous state, both the monomer and the catalyst being introduced under sufficient pressure and for a sufficient period of time contact said provide said catalyst at said leak situs and to contact said leak situs with said monomer while said catalyst is present, thereby to form said organic polymer seal at the situs of the leak.

4,026,977

PREPARATION OF ANISOTROPIC SEMI-PERMEABLE MEMBRANES OF POLYARYL ETHER/SULPHONES

Jack Bourganel, Lyon, France, assignor to Rhone-Poulenc S.A., Paris, France

Filed May 19, 1972, Ser. No. 254,882

Claims priority, application France, May 24, 1971, 71.18635

Int. Cl.² B01D *31/00*

U.S. Cl. 264—41 **14 Claims**

1. Process for preparing an anisotropic sulphonated polyaryl ether/sulphone membrane by casting a solution of the polymer on a support, immersing the supported film in a coagulating bath and then recovering the film, in which:

a. the sulphonated polyaryl ether/sulphone used possesses between about 0.3 and 2 meg/g of sulphonic acid groups and a reduced specific viscosity of between about 40 and 200 cm^3/g (measured as a 2 g/l solution in DMF at 25° C);

b. the concentration of the casting solution is between about 5 and 60% w/v;

c. the coagulation bath comprises, per 100 parts of water, about 5 to 100 parts of a salt formed by an anion of a strong inorganic acid and a metal cation and about 1 to 120 parts of a solvent for the polymer;

d. the temperature of the coagulation bath is between about −30° and +30° C;

e. the period of immersion in the coagulation bath is between about 30 seconds and 60 minutes; and

f. the immersion of the film in the coagulation bath is preceded by gelling the polymer layer.

4,026,978

METHOD OF MAKING ASYMMETRIC CELLULOSE TRIACETATE MEMBRANES

Charles R. Mungle, and Ronald L. Fox, both of San Diego, Calif., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed July 17, 1975, Ser. No. 596,883

Int. Cl.² B29D *27/04, 27/20;* **B01D** *39/00*

U.S. Cl. 264—41 **6 Claims**

1. A method for making an asymmetric cellulose triacetate semipermeable membrane, which method comprises

forming a solution of cellulose triacetate having an acetyl content of 43.5 percent, by dissolving said cellulose triacetate in a solvent mixture of acetone and dioxane wherein said casting solution contains a ratio of dioxane to acetone of about 3.8 to 1 and also contains a swelling agent consisting of a mixture of methanol and maleic acid,

casting said solution to form a film,

evaporating solvent from one surface of said film for sufficient time to form a dense gel layer at said surface, and

then treating said film with water to form a gel, and

thereafter annealing said gelled film by immersion in water at a temperature of about 85° C, to thereby provide an asymmetric semipermeable membrane having a high salt-rejection capability and good flux.

4,026,979

CONTINUOUS PRODUCTON OF EXPANDED CELLULAR MATERIAL OF CIRCULAR CROSS SECTION

Severiano Palomares, Madrid, Spain, assignor to Policastilla, S/A, Madrid, Spain

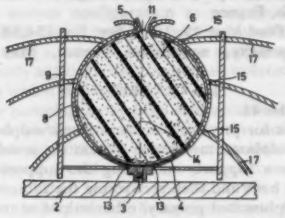
Filed Feb. 26, 1975, Ser. No. 553,115

Int. Cl.² B29D *27/04*

U.S. Cl. 264—45.5 **5 Claims**

1. A method for the production of expanded foam blocks having circular cross-section comprising depositing the foam in a deposit zone on a flexible coating band which overlays a movable flexible feed belt, synchronously moving the flexible coating band and flexible feed belt in contiguity with the inner wall of a stationary longitudinal shaping mold which varies in cross-sectional shape over at least a portion thereof from the

deposit zone to a discharge zone, the shaping mold cross-sectional shape being circular in the discharge zone.



2. A method as recited in claim 1 further comprising heating the flexible feed belt before it reaches said shaping mold in order to reduce to a minimum the integral skin formed on said foam blocks.

4,026,980

PROCESS FOR PRODUCING MOULDED EXPANDED UREA FORMALDEHYDE PRODUCTS

Donald Arthur Hubbard, Cambridge, England, assignor to Imperial Chemical Industries Limited, London, England

Filed July 30, 1974, Ser. No. 493,150

Claims priority, application United Kingdom, Aug. 6, 1973, 37196/73

Int. Cl.² B29D *27/04*

U.S. Cl. 264—50 **10 Claims**

1. Process for producing moulded expanded urea formaldehyde products, which comprises the steps of: (a) incorporating in a urea formaldehyde resin solution a catalyst which causes gelling and curing of the resin solution, (b) depositing said mixture into an open top mould to partially fill said mould and permitting said mixture to gel, (c) partially drying and curing the resulting gel at a temperature between ambient temperature and about 70° C to produce a preform, and subsequently (d) closing the mould and heat-treating said preform at a temperature above about 120° C to further cure and expand said preform inside the closed mould.

3. Process as claimed in claim 1, which comprises the step of also incorporating a foaming agent in the resin solution and mechanically heating said solution to incorporate finely-divided air bubbles therein.

4,026,981

METHOD OF MANUFACTURING A PHOTOMAGNETIC MATERIAL HAVING GARNET STRUCTURE

Rudolf Metselaar, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

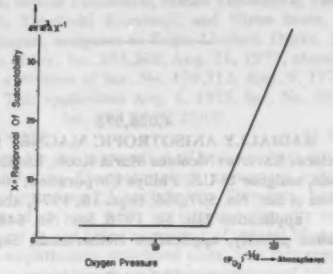
Filed Mar. 28, 1974, Ser. No. 455,788

Claims priority, application Netherlands, Apr. 17, 1973, 7305333

Int. Cl. C04b *35/64*

U.S. Cl. 264—66 **5 Claims**

1. In the method of manufacturing a magnetisable polycrystalline material of yttrium iron garnet for use as an active element whose magnetic properties can be influenced by exposure to light, in which a powder having said yttrium iron garnet composition is compressed to form a body and is sintered in an atmosphere having an oxygen pressure, of one atmosphere the improvement wherein the sintered body is afterfired at a temperature between 800° C and 1350° C said afterfiring temperature being less than the sintering temperature for a period between 1 and 240 hours and under an oxygen pressure which is smaller than said oxygen pressure



during sintering to increase the photomagnetic effect in said material.

4,026,982

METHOD OF AUTOMATIC MANUFACTURE OF CLOSED, INTERNALLY STERILE HOLLOW BODIES

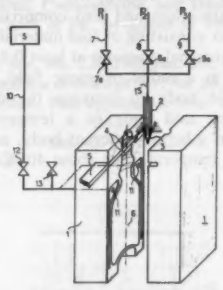
Edgar Dardaine, Sorel-Moussel; Jean-Luc Berry, Mesnil sur l'Estree; Michel Siard, Sainte-Adresse, and Daniel Pellerin, le Harve, all of France, assignors to E. P. Remy & Cie, Dreux, France

Filed Feb. 26, 1975, Ser. No. 553,171

Claims priority, application France, Mar. 22, 1974, 74.09930

Int. Cl.² B29C *17/07*

U.S. Cl. 264—89 **4 Claims**



1. A method for automatically manufacturing sealingly closed and internally sterile hollow bodies in a mold having separable parts that may be moved to open and closed positions, said method comprising extruding a heat-weldable plastic material in the form of a continuous tube having one end which is sealingly closed and its other end which is open and connected exclusively and permanently with a source of sterile gas, introducing said tube as a tubular parison between said parts of the mold in its open position, simultaneously producing in said parison a first pressure of said sterile gas, said first pressure being maintained slightly higher than atmospheric pressure during introduction of the parison in the mold, closing said parts of the mold, creating a vacuum in the mold outside the parison, producing in said parison a second pressure of said sterile gas much higher than said first pressure and providing instantaneous inflation of the parison and therefore the forming of the said hollow body, said vacuum ensuring the escape of the over-pressure of the gas arriving in the parison under said second pressure in case such parison is pierced, then stopping the arrival of sterile gas under said second pressure, producing in the parison a third pressure of said sterile gas corresponding to the desired inflating pressure of

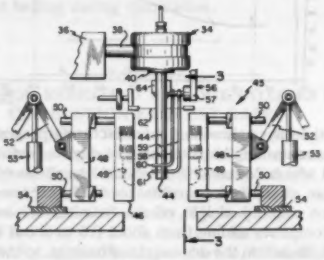
the hollow body and being much lower than said second pressure, said third pressure being applied only after a certain period of time from the moment the arrival of sterile gas under said second pressure is stopped, which period of time allows all the inflating gas under said second pressure which may have been polluted by the mould to be discharged by the vacuum, nipping said other open end of the parison before the end of the application of the said third pressure, restoring said first pressure in the following parison in order to form another hollow body according to the sequential application of the aforesaid first, second and third pressures, severing the so formed firstly mentioned hollow body from said following parison, stopping the vacuum application and opening said parts of the mold for ejecting said internally sterile hollow body.

4,026,983

METHOD OF PRODUCING SEAMLESS TUBULAR ARTICLES HAVING AN ARCUATE PORTION ALONG THE TUBULAR AXIS

David P. Stockwell, Farmington, Conn., assignor to The Beaton & Corbin Manufacturing Co., Southington, Conn.

Filed July 9, 1975, Ser. No. 594,562
Int. Cl.² B29C *17/07*
U.S. Cl. 264—89 **12 Claims**



1. A method for producing a seamless tubular article having an arcuate portion along its tubular axis that leads into at least one straight portion, said method comprising the steps of:

providing partable mating die members having mold cavity portions which cooperate, when said die members are closed, to define a cavity having an arcuate section that leads into at least one straight section configured to the external shape of the article to be formed:

advancing downwardly a depending tubular length of pliable thermoplastic resin having an outside diameter slightly less than the outside diameter of the article to be formed;

while said tubular parison continues advancing downwardly, causing relative movement between the depending end of and the remainder of said tubular length while still pliable, first in a direction lateral to the tubular axis of said length as downwardly advanced and then in an upward direction generally opposed to the tubular axis of said length as advanced to cause a portion of said tubular length to sag into a loop that has the general shape of the arcuate portion of the article being formed but to cause a straight portion of said tubular length, having the general shape of the straight portion of the article being formed, into which the arcuate tubular length portion leads, to remain;

closing said die members about said tubular length with said arcuate and said straight portion lying inside said mold cavity;

introducing a blow molding duct into said tubular length to provide communication with the interior thereof;

introducing fluid under pressure through said duct to force the wall of said tubular length outwardly into contact with the surface of said mold cavity;

separating said die members after the plastic has cooled sufficiently to rigidify; and

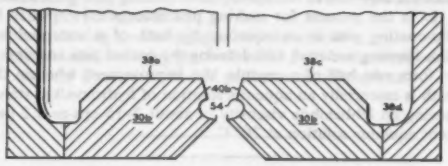
stripping the molded tubular article from said die cavity portions.

4,026,984

METHOD FORMING AN ORIENTED ARTICLE HAVING A BEAD ATTACHED BY A TAPERED STEM

Charles L. Seefluth, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 443,473, Feb. 19, 1974, Pat. No. 3,917,095, which is a division of Ser. No. 250,293, May 4, 1972, Pat. No. 3,817,676. This application Sept. 26, 1975, Ser. No. 617,257
Int. Cl.² B29C *17/07*
U.S. Cl. 264—99 **5 Claims**



1. A method for closing an open and thermoplastic parison which has been heated in the solid state to orientation temperature comprising:

stretching said parison longitudinally;

thereafter applying pressure along a narrow line to opposing side walls of said parison to sever said parison while simultaneously applying lateral pressure to said parison adjacent said severing line to mold said parison adjacent said severing line into a bead along the thus-formed sealing seam while applying pressure along a narrow line between said bead and a bottom wall of the resulting article to form a stem connecting said bead and said bottom wall, said stem being tapered with the wider base portion being adjacent said bottom wall and with sides of said stem sloping at an angle of 10° to 20° so that said stem has a thickness adjacent said bottom wall 1.5 to 4 times a thickness thereof adjacent said bead; and

maintaining pressure on said bead to hold said walls of said parison together and form a seal as blow fluid is introduced into the interior of said parison to cause same to conform to the shape of a molding zone.

4,026,985

SHIRRED TUBULAR FOOD CASINGS HAVING A BARRIER COATING

Jerome J. M. Rasmussen, South Stickney Township, Ill., assignor to Union Carbide Corporation, New York, N.Y.

Division of Ser. No. 276,919, Aug. 1, 1972, Pat. No. 3,886,979. This application May 5, 1975, Ser. No. 574,629
Int. Cl.² A22C *13/00*
U.S. Cl. 264—129 **4 Claims**

1. In the method of producing a shirred and compressed tubular cellulosic food casing having a continuous moisture and gas barrier coating adhered to the surface thereof the steps comprising;

a. applying to a surface of a tubular cellulosic food casing a coating composition suitable to provide a continuous moisture and gas barrier coating having an extensibility measured at 32° F of at least about 4% on the surface of said casing;

b. heat treating the coated casing to cause the coating to adhere directly to and form a continuous barrier coating on said casing, whereby the moisture content of said casing is reduced;

c. moisturizing the barrier coated tubular casing to a moisture content of at least about 10% by weight;

d. advancing said moisturized tubular food casing having a continuous barrier coating adhered to the surface thereof in an inflated state about a mandrel to and through a shirring means where said inflated casing is shirred; and then

e. advancing said shirred casing from the shirring means to compressing means where said shirred casing is compressed.

4,026,986
CAPSULE SHELL

Jimmie Duane Christen, Clute, Tex., and Wen-Jiu Cheng, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed May 22, 1975, Ser. No. 580,116
Int. Cl.² B29C *13/00, 13/04*
U.S. Cl. 264—301 **3 Claims**

1. In the process for making pharmaceutical capsules by dip-coating pins in an aqueous dip bath of a water-soluble film-forming material, withdrawing the coated pins and drying to form one half of a capsule, the improvement wherein the bath is essentially an aqueous solution of hydroxyalkyl starch having an Ubbelohde viscosity of about 2–15 cps as a 2 percent aqueous solution at 20° C.

4,026,987
RECOVERY OF URANIUM SULFATE ANIONS ON A WEAK BASE ANION EXCHANGE RESIN

Peter A. Yarnell, Andalusia, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Filed Oct. 11, 1974, Ser. No. 513,979
Int. Cl.² C01G *43/00*
U.S. Cl. 423—7 **13 Claims**

1. In the method of recovering uranium from sulfuric acid leach liquor by adsorption of the uranium as an anionic sulfate complex on an amine anion exchange resin, the improvement which comprises using as the resin a dense weak base, anionic exchange resin, said resin having tertiary amine groups and said resin being the condensation product of polyethyleneimine and ethylene dichloride and wherein thereafter the resin is subjected to reductive methylation with formaldehyde and formic acid.

4,026,988
SELECTIVE EXTRACTION OF MOLYBDENUM FROM ACIDIC LEACH LIQUORS

Barry A. Wells, and Don Richard Clark, both of Centerville, Utah, assignors to Kennecott Copper Corporation, New York, N.Y.

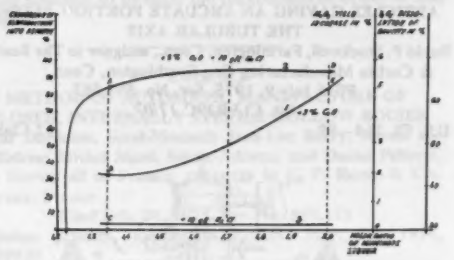
Filed Dec. 22, 1975, Ser. No. 642,689
Int. Cl.² C01G *39/00*
U.S. Cl. 423—54 **10 Claims**

1. A method of selectively recovering dissolved molybdenum values from an aqueous solution containing, in addition to said dissolved molybdenum values, at least one other dissolved metal selected from the group consisting of arsenic, bismuth, copper, iron, antimony, tin, and lead, said method comprising adjusting the pH of the aqueous molybdenum-bearing solution to about 2.0 or less; contacting the pH-adjusted, molybdenum-bearing, aqueous solution with an organic extracting solution comprising a hydrocarbon solvent containing a sufficient amount of alpha-hydroxy oxime to selectively extract said molybdenum values from said aqueous solution; separating the loaded organic extracting solution containing said molybdenum values from the aqueous raffinate; stripping said molybdenum values from the organic extracting solution with an aqueous stripping solution containing ammonium hydroxide; adding nonylphenol to the organic extracting solution prior to said stripping thereof, so that a sufficient amount of nonylphenol is present in the organic extracting solution during the stripping step to increase the efficiency of the aqueous ammonium hydroxide solution in stripping molybdenum values from the organic solution; and recovering the molybdenum values from the aqueous stripping solution.

4,026,989
PROCESS FOR THE DIGESTION OF GOETHITE-CONTAINING BAUXITES

Ferenc Orbán; Mária Orbán; Tihamér Pintér; György Zsigmond; Péter Siklósi; Karoly Solymár; Pal Toth, and János Zambo, all of Budapest, Hungary, assignors to Aluminiumipari Tervezo Vallalat and Femipari Kutato Intezet, both of Budapest, Hungary

Continuation-in-part of Ser. No. 379,654, July 16, 1973, abandoned. This application Sept. 29, 1975, Ser. No. 617,979
Int. Cl.² C01F *7/06*
U.S. Cl. 423—121 **3 Claims**



1. In the Bayer aluminum manufacturing process wherein a goethite-containing bauxite slurry is digested in a wet caustic solution which contains from about 1 to about 6% CaO or a derivative thereof convertible to CaO, expressed as CaO based on the dry weight of the bauxite, the improvement which comprises adding from about 0.5 to about 12% sodium chloride, based on the dry weight of bauxite, to the slurry or to one or more ingredients of the slurry, and carrying out said digestion in a single step at a temperature of from about 230° C to about 260° C, and after digestion the molar ratio of aluminate liquor being between about 1.3 and about 1.4.

4,026,990
PRODUCTION OF LOW-FLUORINE GYPSUM AS A BY-PRODUCT IN A PHOSPHORIC ACID PROCESS

Werner Czysch, Linz; Walter Müller, Leonding, and Heinz Göller, Linz, all of Austria, assignors to Chemie Linz Aktiengesellschaft, Linz, Austria

Filed Dec. 11, 1975, Ser. No. 639,928
Claims priority, application Austria, Dec. 11, 1974, 9892/74
Int. Cl.² C01F *1/00, 5/00, 11/00;* C22B *26/20*
U.S. Cl. 423—167 **5 Claims**

1. In a method for recovering waste gypsum from the wet phosphoric acid process, which method comprises digesting and decomposing crude phosphate in sulfuric acid, filtering waste gypsum from the reaction mixture, mixing the waste gypsum with water to form an aqueous suspension, separating the waste gypsum from the water and drying the separated waste gypsum, the improvement wherein an active silicic acid selected from the group consisting of ground quartz, sand, kieselgur and precipitated silicic acid is added to the reaction system in two portions totaling 1 to 4% by weight based on the weight of the crude phosphate, the first portion of the active silicic acid constituting one-half to two-thirds the total amount of the active silicic acid and the second portion of the active silicic acid constituting the remainder of the total amount of the active silicic acid, said first portion being added to the reaction system prior to digestion and decomposition of the crude phosphate, said second portion being added to the reaction system subsequent to digestion and decomposition of

the crude phosphate and prior to filtration of the waste gypsum from the reaction mixture,

said improved method resulting in recovery of waste gypsum having a fluorine content not greater than 0.25% by weight based on the weight of the calcium sulfate in the waste gypsum.

4,026,991

PROCESS FOR STABILIZING LIME MUD

Ralph Joseph Chamberlain, Stamford, Conn., assignor to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 622,597, Oct. 15, 1975, which is a continuation of Ser. No. 452,902, March 20, 1974, abandoned. This application July 12, 1976, Ser. No. 704,701

Int. Cl.² C01F *11/06*

U.S. Cl. 423—177 8 Claims

1. A process for stabilizing lime mud so as to eliminate balling during calcination of the same which consists essentially in the steps of: incorporating a surface active agent decomposable at a temperature below 1500° F into lime mud comprising calcium carbonate wherein said surfactant is added in an amount ranging from 0.3 pound to 5.0 pounds per ton of dry calcium carbonate, filtering said treated lime mud, and thereafter calcining said treated lime mud at temperatures ranging between 1500° F and 2000° F to recover calcium oxide absent balling during calcination.

4,026,992

METHOD FOR REMOVING NITROGEN OXIDES FROM COMBUSTION EXHAUST GASES

Shujiro Shiga, Chiba; Takeshi Katsumata, Ichihara; Eiji Inaba, Ichihara; Yasushi Okamoto, Ichihara; Atsushi Inmaru, Togane; Tsugio Nishioka, Ichihara; Takashi Nakata, Ichihara, and Seiji Takaki, Ichihara, all of Japan, assignors to Sumitomo Chemical Company, Limited, Japan

Filed Oct. 31, 1975, Ser. No. 627,762

Claims priority, application Japan, Nov. 6, 1974, 49-128474

Int. Cl.² B01D *53/34*

U.S. Cl. 423—239 10 Claims

1. A method for removing nitrogen oxides from a combustion gas which comprises first removing sulfur oxides by a wet process comprising absorption in an aqueous or slurry of an effective absorbent for said sulfur oxides and secondly removing nitrogen oxides by a dry catalytic reduction, wherein the gas obtained after removing the sulfur oxides by said wet process is passed through a wet electrostatic precipitator to remove most of the impurities therefrom, passed through a dummy catalyst layer which is not catalytically active for reducing the nitrogen oxides with ammonia and which comprises carrier particles made of the same carrier as is employed in the second catalyst layer to remove the remaining impurities therefrom, and then passed through a second catalyst layer comprising a metal oxide effective for reducing the nitrogen oxides to nitrogen gas in the presence of ammonia.

4,026,993

SYNTHESIS OF DECABORANE-14 AND ALKYL-SUBSTITUTED DECABORANE-14

Jerome F. Ditter, Santa Ana, and Eugene B. Klusmann, Irvine, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 23, 1976, Ser. No. 716,730

Int. Cl.² C01B *35/18*

U.S. Cl. 423—294 7 Claims

1. A method for preparing a mixture of decarborane-14 and alkyl-substituted dicarborane which comprises:

admixing an ethereal solution of nonaborane-14 ions with an dialkylboronhalide, wherein said halide is selected from the group consisting of chloride and bromide, at a temperature from 20° C to 30° C.

4,026,994

METHOD FOR MANUFACTURING GALLIUM PHOSPHIDE

Makoto Tashiro; Keijiro Hirahara; Akihiro Yahata, all of Yokohama, and Masanobu Ohyama, Zushi, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Feb. 13, 1976, Ser. No. 658,018

Claims priority, application Japan, Feb. 17, 1975, 50-18738; Apr. 17, 1975, 50-45841

Int. Cl.² C01B *25/00*

U.S. Cl. 423—299 7 Claims

1. A method for manufacturing gallium phosphide comprising:

a. charging gallium orthophosphate and an additive selected from the group consisting of phosphorous and gallium phosphide into a reactor:

b. heating said gallium orthophosphate at a temperature of 750°–1100° C; and

c. introducing a reducing gas into the reaction;

wherein said reducing gas is directed both horizontally and vertical down toward said gallium orthophosphate.

4,026,995

PROCESS FOR DEFLUORINATION OF COMMERCIAL PHOSPHORIC ACID

Everett N. Case, Airville, Pa., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Continuation-in-part of Ser. No. 657,117, Feb. 11, 1976, abandoned, which is a continuation-in-part of Ser. No. 448,154, March 4, 1974, abandoned. This application Apr. 12, 1976, Ser. No. 676,093

Int. Cl.² C01B *25/16*

U.S. Cl. 423—321 R 15 Claims

1. A process for the defluorination of wet process phosphoric acid containing sulfate ions and fluosilicate ions which comprises adding to the phosphoric acid a calcium phosphate thereby precipitating calcium sulfate and forming an acid solution having an increased Ca^{++} ion and P_2O_5 concentration, diluting said acid solution with water to adjust the P_2O_5 concentration to within a range of about 18 to 32 percent P_2O_5, adjusting the calcium concentration, calculated as CaO, by adding a calcium phosphate at about 25° C. to 75° C. to achieve substantially the maximum calcium content in the solution while maintaining a pH of the acid solution at about 2 or below, raising the temperature of said solution to about the boiling point and maintaining the P_2O_5 concentration by dilution with water to within the 18 to 32 percent P_2O_5 range and maintaining said solution at the boiling point to effect the precipitation of calcium fluoride, separating the precipitated calcium fluoride from said solution leaving an acid solution having an increase in total free phosphoric acid as compared to the diluted acid solution prior to heating.

4,026,996

SYNTHESIS OF NITRYL PERCHLORATE

Carl J. Schack, Chatsworth, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed May 28, 1974, Ser. No. 474,130

Int. Cl.² C01B *21/52*

U.S. Cl. 423—386 2 Claims

1. The method of synthesizing nitryl perchlorate comprising the step of:

combining chlorine nitrate and ozone in the presence of an inert fluorocarbon solvent at a temperature in the range from about −78° C to about ambient.

4,026,997

PROCESS FOR THE PRODUCTION OF AMMONIUM FLUORIDE FROM FLUOSILICIC ACID

Siegfried Schneider; Wolfgang Weis, both of Cologne; Volker Beyl, Leverkusen, and Hans Niederprum, Monheim, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation of Ser. No. 502,251, Aug. 29, 1974, abandoned. This application Apr. 13, 1976, Ser. No. 676,604

Claims priority, application Germany, Sept. 21, 1973, 2347485

Int. Cl.² C01C *1/16;* C01B *33/12*

U.S. Cl. 423—470 5 Claims

1. In the production of an ammonium fluoride solution by precipitating hexafluosilicic acid from its solution with ammonia and from the resulting suspension separating off the silicon dioxide precipitated, the improvement which comprises continuously and simultaneously feeding aqueous solutions of hexafluosilicic acid and ammonia to a mixed precipitation zone maintained at a temperature of about 40° to 90° C to form a suspension of silicon dioxide, the solutions being supplied in such proportions that the suspension obtained contains about 1.5 to 3.5% of free ammonia and at most 22% of ammonium fluoride, the average residence time of the reactants in the precipitation zone being about 8 to 15 minutes and filtering the solution to produce a filter cake comprising coarse SiO_2 having a solids content of about 55 to 75% by weight, the rate of filtration for a 250 ml aliquot portion being less than about 25 seconds.

4,026,998

CARBON ARTEFACTS

Michael Anthony Ambrose Jorro; Terry Dean Rantell, and Diana Louise Tosswill, all of Cheltenham, England, assignors to Coal Industry (Patents) Limited, London, England

This application Dec. 2, 1975, Ser. No. 637,012

Claims priority, application United Kingdom, Jan. 3, 1975, 00261/75

Int. Cl.² C01B *31/02, 31/04, 7/04*

U.S. Cl. 423—445 7 Claims

1. A composite carbon artefact comprising 15–35% carbonised binder, 15–84% calcined coke grist and 1–50% of disoriented carbon fibre rods composed of carbon fibres in a carbonised matrix.

4,026,999

PRODUCTION OF IRON (II) CHLORIDE AND CHLORINE FROM FERRIC CHLORIDE

Karl-Friedrich Knoche, Kersten Pavillon Lousberg; Helmut Cremer, Boxgraben 79, and Gerhard Steinborn, Roermonder Str. 309, all of 51 Aachen, Germany

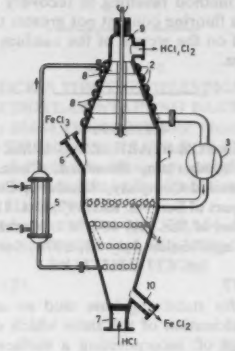
Filed Sept. 12, 1975, Ser. No. 613,001

Claims priority, application Germany, Sept. 14, 1974, 2444062

Int. Cl.² C01G *49/10;* C01B *7/03*

U.S. Cl. 423—493 11 Claims

1. A method for manufacturing iron(II)chloride from iron(III)chloride comprising supplying iron(III)chloride to a reactor whereby the dimeric form of iron(III)chloride is eventually introduced into the upper part of said reactor, completely condensing the dimeric iron(III)chloride in said upper part by cooling it to a temperature below the melting point of iron(III)chloride thereby producing the monomeric form of iron(III)chloride, said monomericiron(III)chloride falling to the lower part of said reactor, maintaining said lower part at a temperature above the melting point of iron(III)chloride, evaporating monomeric iron(III)chloride in said lower part to the dimeric form of iron iron(III)chloride thus forming within the reactor a continuously reacting circulating system of falling monomeric iron(III)chloride and rising dimeric iron(III)-chloride vapors, said continuously reacting system of iron(III)chloride yielding solid iron(II)chloride in said lower part



and chlorine gas, and removing said solid iron(II)chloride from said lower part.

4,027,000

PROCESS FOR HALOGEN PRODUCTION

Christiaan P. van Dijk, Westfield, N.J., assignor to Pullman Incorporated, Chicago, Ill.

Continuation of Ser. No. 466,574, May 3, 1974, abandoned. This application Dec. 22, 1975, Ser. No. 642,843

Int. Cl.² C01B *7/04*

U.S. Cl. 423—507 14 Claims

1. A process for producing chlorine or bromine from the respective hydrogen halide in a reaction system having a reaction zone at the top of the system and a regeneration zone in the lower portion of the system and maintaining within said system a stoichiometric excess of active nitrogen with respect to said hydrogen halide in said system which comprises:

introducing sulfuric acid to the top of said reaction system to flow downwardly as a liquid phase and maintain the active nitrogen within said system, a part of which is converted to nitrosylsulfuric acid;

introducing steam to said liquid phase in the regenerating zone of said reaction system to maintain the active nitrogen within said system whereby said nitrosylsulfuric acid is stripped from said liquid phase and regenerated as a mixture of nitrogen monoxide and nitrogen dioxide;

introducing below said reaction zone said hydrogen halide in an amount which is stoichiometrically less than the active nitrogen present in said system whereby said hydrogen halide enters said reaction zone as hydrogen halide or nitrosylhalide;

introducing oxygen to said regenerating zone in an amount sufficient to oxidize a sufficient quantity of said nitrogen monoxide to gaseous nitrogen dioxide, said oxidization occurring in an oxization zone located at the upper portion of said regenerating zone whereby at least a stoichiometric amount of said gaseous nitrogen dioxide is introduced to said reaction zone as compared to hydrogen halide or nitrosylhalide; and

reacting in said reaction zone said nitrogen dioxide with said hydrogen halide or nitrosylhalide to produce gaseous chlorine or bromine which flows out of said system countercurrently to said liquid phase.

4,027,001

PROCESS FOR RECOVERING SULFUR FROM SULFUR DIOXIDE

James M. Henderson, New Brunswick, and John B. Pfeiffer, South Plainfield, both of N.J., assignors to Asarco Incorporated, New York, N.Y.

Continuation-in-part of Ser. Nos. 584,670, June 6, 1975, and Ser. No. 584,671, June 6, 1975, abandoned. This application Apr. 12, 1976, Ser. No. 676,189
Int. Cl.² C01B 17/04
U.S. Cl. 423—570 12 Claims

1. In a process for the recovery of elemental sulfur by catalytic reduction comprising contacting a gas mixture comprising sulfur dioxide, hydrogen and carbon monoxide in a reaction zone with a supported metal of Group VIII of the Periodic Table as catalyst at a reaction temperature, and recovering elemental sulfur from a resulting gas mixture comprising sulfur vapor, residual sulfur dioxide and hydrogen sulfide, the improvement comprising supplying the catalyst in an initial upstream portion of the reaction zone wherein a high heat release occurs as a supported sulfate of an iron group metal of Group VIII whereby decrepitation of the catalyst is substantially eliminated in the zone of high heat release.

4,027,002

HYDROGEN SULPHIDE REMOVAL PROCESS

William H. Powlesland, and James W. Smith, both of Toronto, Canada, assignors to Powlesland Engineering Limited, Rexdale, Canada

Filed Aug. 29, 1975, Ser. No. 608,843
Int. Cl.² C01B 17/04
U.S. Cl. 423—573 G 2 Claims

1. A process for the removal of H_2S from a fouled gas containing O_2 or SO_2 or both, comprising the steps:

passing the fouled gas continuously upwardly through a mass of porous hematite pellets in a chamber while the pellets are passed downwardly therethrough, thereby producing water and forming an elemental sulphur coating on the pellets,

continuously withdrawing the sulphur-coated pellets from the bottom of the chamber, continuously tumbling the pellets against one another to abrade the elemental sulphur from their surfaces, and continuously returning the abraded pellets to the top of the chamber,

the elemental sulphur coating being formed in accordance with either the equations (a) and (b), or the equation (c), or the equation (d) as follows:

a $3H_2S + Fe_2O_3 = Fe_2S_3 + 3H_2O + 14{,}800$ cal.

b $Fe_2S_3 + 1½O_2 + Fe_2O_3 + 3S + 144{,}000$ cal.

c $2H_2S + O_2 = 2H_2O + 2S + 106{,}520$ cal. (Iron Oxide Catalyst)

d $2H_2S + SO_2 = 2H_2O + 3S + 46{,}230$ cal.

the pellets additionally being passed over a vibrating separator screen to separate abraded and comminuted elemental sulphur and to separate pellets which have been abraded below a predetermined dimension as established by the screen mesh size.

4,027,003

THERMOCHEMICAL PRODUCTION OF HYDROGEN AND OXYGEN FROM WATER

William H. Dorrance, and Rane L. Curl, both of Ann Arbor, Mich., assignors to Organization Control Services, Inc., Ann Arbor, Mich.

Filed Oct. 30, 1975, Ser. No. 627,246
Int. Cl.² C01B 13/00, 1/00
U.S. Cl. 423—579 26 Claims

1. The process for generation of hydrogen and oxygen from water comprising the steps of:

a. decomposing a metal trichloride, selected from the group consisting of samarium, europium and ytterbium trichlorides, at a temperature sufficient to produce a metal dichloride and chlorine gas;

b. removing the chlorine formed during said decomposition;

c. bringing the chlorine into contact with a metal oxide at a temperature sufficient to produce a metal chlorine and oxygen, the metal oxide being selected from a group consisting of magnesium, nickel, cobalt and yttrium oxides;

d. removing and collecting the oxygen produced during the chlorine-metal oxide reaction;

e. hydrolyzing the metal chloride formed during the reaction of step (c) at a temperature sufficient to produce the metal oxide used during step (c) and hydrogen chloride gas;

f. reacting the hydrogen chloride produced by the reaction step (e) with the metal dichloride produced by step (a) at a temperature sufficient to produce a metal trichloride and hydrogen gas;

g. removing and collecting said hydrogen gas; and

h. decomposing said trichloride as recited in step (a), and repeating the cycle.

17. The process for generation of hydrogen and oxygen from water comprising the steps of:

a. decomposing a metal tribromide, selected from the group consisting of vanadium and chromium tribromides, at a temperature sufficient to produce a metal dibromide and bromine gas;

b. removing the bromine formed during said decomposition;

c. bringing the bromine in contact with a metal oxide at a temperature sufficient to form a higher valence metal oxide and a metal bromide, the metal oxide being selected from a group consisting of manganese and cobalt oxides;

d. removing the metal oxide and metal bromide products of the reaction of step (c) and separating them;

e. removing said metal oxide;

f. decomposing the metal oxide at a temperature sufficient to produce a lower valence metal oxide and oxygen gas;

g. removing and storing said oxygen;

h. removing the metal bromide separated in step (d);

i. hydrolyzing the removed metal bromide at a temperature sufficient to produce a metal oxide and hydrogen bromide;

j. collecting the metal oxides produced by steps (f) and (i) and reacting them with bromine as recited in step (c);

k. reacting the hydrogen bromide produced by the reaction of step (i) with the metal dibromide produced in step (a) at a temperature sufficient to produce a metal tribromide and hydrogen gas;

l. removing and collecting said hydrogen gas; and

m. decomposing said tribromide as recited in step (a) and repeating the cycle.

4,027,004

RHENIUM OXIDES OF TYPES $MReO_4$ AND M'_2ReO_6

Arthur William Sleight, Kennett Square, Pa., assignor to E. I. Du Pont de Nemours & Company, Wilmington, Del.

Continuation-in-part of Ser. No. 468,693, May 10, 1974, abandoned. This application May 10, 1976, Ser. No. 684,934
Int. Cl.² C01G 47/00
U.S. Cl. 423—593 15 Claims

1. A compound of the group consisting of $MReO_4$ and M'_2ReO_6, wherein M is Mg, Zn, Mn, Al, Ga, Fe, Co, or Ni and M′ is Cr or Fe.

12. The process of preparing a compound of claim 1 which comprises heating together appropriate proportions of rhenium oxide and at least one of the oxides of M or M′ and appropriate proportions of whichever of the metals Re, M and M′ are necessary to provide the stoichiometry of the product, at a temperature of at least about 800° C and a pressure of at least about 25 kbars.

4,027,005

DIAGNOSTIC AGENTS

Norman Adler, Arlington; Leopoldo Lazaro Camin, Lexington, both of Mass., and Paul Gold, Hollis, N.H., assignors to New England Nuclear Corporation, Boston, Mass.

Filed June 7, 1974, Ser. No. 477,069
Int. Cl.² A61K *29/00, 43/00*
U.S. Cl. 424—1 30 Claims

1. A radioactive diagnostic composition, comprising a product of admixture of technetium-99m, a reducing agent, and salt of a polyhydroxycarboxylic acid selected from the group of glucoheptonic acid, lactobionic acid, galacturonic acid and glucuronic acid.

4,027,006

PROCESS FOR THE PRODUCTION OF ALLERGEN-CONTAINING EXTRACTS

Otto Nieschulz, Hamburg; Günther Rüdiger, Reinbek, and Jürgen Maass, Kroppelshagen, all of Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Germany

Division of Ser. No. 421,791, Dec. 5, 1973, Pat. No. 3,953,588. This application Jan. 12, 1976, Ser. No. 648,293
Claims priority, application Germany, Dec. 11, 1972, 2260455; Oct. 20, 1973, 2352724
Int. Cl.² A61K *39/00, 39/36*
U.S. Cl. 424—12 4 Claims

1. In a process for preparing an allergen extract which includes pre-extracting an allergen-containing material having a plurality of allergens, a portion of which is more lipophilic in character than the remainder, with a lipophilic solvent consisting essentially of an aqueous solution of a neutral, water-soluble cyclic ether having a boiling point below 105° C. which is at least one member selected from the group consisting of tetrahydrofuran, tetrahydropyran and dioxane to extract said lipophilic portion; extracting resultant allergen-containing material with a hydrophilic aqueous or aqueous alcoholic allergen solvent; and recovering water-soluble allergens from said material; the improvement which comprises:

a. separating undissolved solids from said pre-extraction step and concentrating the separated liquid phase at a temperature not exceeding 40° C.;
b. extracting said separated undissolved solids with said hydrophilic aqueous or aqueous alcoholic allergen solvent; and
c. combining the resultant extracts to form an allergen extract containing both hydrophilic and lipophilic portions.

4,027,007

ANTIPERSPIRANTS FORMULATED WITH BORAX

Ralph P. Messina, Somerset, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Continuation of Ser. No. 96,639, Dec. 9, 1970, abandoned. This application Mar. 13, 1973, Ser. No. 340,901
Int. Cl.² A61K *9/14, 7/38*
U.S. Cl. 424—46 1 Claim

1. A method for reducing the staining potential of a powder aerosol antiperspirant composition admixing as a stain inhibitor about 0.1 to 5% of finely divided borax, having a particle size such that it passes through a 325 mesh screen, with a substantially anhydrous suspension, in about 85 to 95% of a liquified, gaseous propellant, of about 0.5 to 10% of finely divided astringent antiperspirant aluminum chlorhydroxy powder having a particle size such that it passes through a 200 mesh screen.

4,027,008

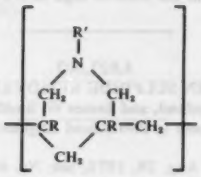
HAIR BLEACHING COMPOSITION CONTAINING WATER-SOLUBLE AMINO AND QUATERNARY AMMONIUM POLYMERS

Phillip E. Sokol, Chicago, Ill., assignor to The Gillette Company, Boston, Mass.

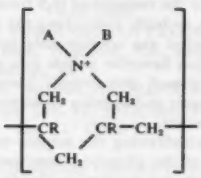
Division of Ser. No. 577,616, May 14, 1975, Pat. No. 3,986,825, which is a division of Ser. No. 267,664, June 29, 1972, Pat. No. 3,912,808, which is a continuation-in-part of Ser. No. 14,205, Feb. 25, 1970, abandoned. This application Apr. 12, 1976, Ser. No. 676,362
Int. Cl.² A61K *7/135*
U.S. Cl. 424—62 14 Claims

1. A hair bleaching composition containing, in addition to a bleaching agent,

water and a water soluble polymer having a molecular weight from 20,000 to 3,000,000 and having a molecular chain containing units selected from the group consisting of



and



wherein R is hydrogen or methyl; R′ is hydrogen, alkyl having one to twenty-two carbon atoms, lower hydroxyalkyl having from one to five carbon atoms, or lower alkyl containing a terminal amido group; and A and B are independently alkyl having from one to twenty-two carbon atoms, lower hydroxyalkyl or lower alkyl containing a terminal amido group, or wherein A and B taken together with N are piperidinyl or morpholinyl, the amount of said polymer being from 0.05% to 40% by weight of the total composition.

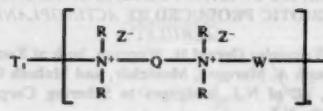
4,027,009

COMPOSITIONS AND METHODS FOR DEPRESSING BLOOD SERUM CHOLESTEROL

Nathaniel Grier, Englewood, N.J.; Merwin F. Hoover, Pittsburgh, Pa.; Jesse W. Huff, Westfield, and Gunther W. Kuron, Freehold Township, Union County, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 369,037, June 11, 1973, abandoned. This application Apr. 23, 1974, Ser. No. 463,071
Int. Cl.² A61K *31/74*
U.S. Cl. 424—78 13 Claims

1. A method for lowering mammalian blood serum cholesterol levels and binding bile acids in the gastrointestinal tract comprising orally administering an effective bile acid binding dose of a polymer having linear backbone which is neither branched nor crosslinked of the structure:



wherein Q is $(CH_2)_x$ and W is $(CH_2)_y$ and, when x is the integer 2, y is an integer of from 4 to 8 inclusive, and when x is an integer of from 3 to 8 inclusive, y is an integer of from 3 to 8 inclusive; or Q and W are C_3 to C_8 hydroxy substituted straight or branched chain alkylene groups wherein the hydroxy substituent is on a carbon atom other than one bonded directly to nitrogen; R is C_1 to C_4 alkyl; Z is a physiologically acceptable anion; T_1 and T_2 are terminal groups, and n is an integer within a range such that molecular weight of the polymer is 1,500 to 70,000.

4,027,010
ANTISTAPHYLOCOCCOUS HUMAN IMMUNOGLOBULIN AND METHOD OF PREPARING SAME

Anatoly Efimovich Kiselev, ulitsa Kostyakova, 8/6, kv. 182; Semen Vladimirovich Skurkovich, Frunzensky val, 38, kv. 103; Tatyana Vasilievna Golosova, ulitsa B. Gruzinskaya, 62, kv. 82; Anatoly Alexandrovich From, ulitsa Flotskaya, 28, korpus 1, kv. 84; Grigory Fedoseevich Papko, Malaya Moskovskaya ulitsa, 27, kv. 8; Ljudmila Semenovna Shenkman, Shmitovsky proezd, 1, kv. 47, and Tatyana Pavlovna Anikina, ulitsa Dubninskaya, 39, korpus 3, kv. 44, all of Moscow, U.S.S.R.

Filed Apr. 15, 1975, Ser. No. 568,371
Int. Cl.² A61K *39/40*
U.S. Cl. 424—87 **2 Claims**

1. Antistaphylococcus human immunoglobulin consisting of the gamma globulin fraction isolated from the plasma of blood of man immunized with staphylococcus toxoid, containing staphylococcus α-antitoxin in the titre from 50 to 640 Units per ml and agglutinins against staphylococci in the titre to 1:20480.

4,027,011
REARING PIGS

Ian Roland Hill, Eversley; Raymond Kenworthy, Catworth, and Philip Porter, Putnoe, all of England, assignors to N.V. Internationale Octrooi Maatschappij "Octropa", Rotterdam, Netherlands

Continuation of Ser. No. 604,743, Aug. 14, 1975, abandoned, which is a continuation of Ser. No. 445,381, Feb. 25, 1974, abandoned, which is a continuation of Ser. No. 144,686, May 18, 1971, abandoned. This application May 19, 1976, Ser. No. 687,785
Claims priority, application United Kingdom, June 3, 1970, 26746/70
Int. Cl.² A61K *39/02, 39/40*
U.S. Cl. 424—92 **16 Claims**

1. A method of improving resistance to infection by stimulating intestinal production of appropriate antibodies and thereby immunizing a pig against gastro-intestinal disorders caused by certain selected pig pathogenic E. coli serotypes consequent on a change of environment or diet, comprising causing the pig to eat or drink an orally non-toxic composition comprising the water-soluble endotoxins freed from association with the bacterial cell walls of one or more of the pathogenic strains of E. coli bacterium having the serotypes 08, 045, 0138, 0139, 0141, 0147 and 0149, said endotoxins being stable to heating at 100° C. and said composition being substantially free from the living pathogenic E. coli organisms and being administered to the pig in amounts sufficient to stimulate the intestine of said pig to produce antibodies to said pathogenic E. coli organisms and with a frequency to maintain a daily circulation of said antibodies in the intestine.

4,027,012
PROCESS FOR THE EXTRACTION OF COMPONENTS HAVING ANTICOAGULANT ACTIVITY "IN VIVO" FROM SNAKE VENOMS AND PRODUCTS OBTAINED

Eraldo Antonini, Rome, Italy, assignor to Laboratori Biochimici Fargal-Pharmasint S.p.A., Rome, Italy

Continuation of Ser. No. 481,724, June 21, 1974, abandoned. This application Apr. 5, 1976, Ser. No. 673,844
Claims priority, application Italy, Sept. 3, 1973, 52309/73
Int. Cl.² A61K *35/58*
U.S. Cl. 424—98 **9 Claims**

1. In a chromatographic separation process for extracting and isolating from snake venom the enzymatic component having "in vitro" coagulant activity and "in vivo" anticoagulant activity from the other components having in vitro coagulant activity and from the protein components, wherein said snake venom is dissolved in a medium suitable for chromatographic separation, the improvement comprising:

A. providing a column of a water-insoluble solid support for selective absorption of said in vivo anticoagulant enzyme, being a polymer substance containing hydroxyl groups and which can be bound to arginine; and having bound thereto by covalent bond, as an inhibitor of said enzyme, arginine;

B. introducing the snake venom dissolved in said medium suitable for chromatographic separation into said column;

C. eluting the column with a first elution medium having a pH 6–7 and molarity of 0.05 M or less;

D. collecting eluate in subsequent portions until the elution of more than 95% of the protein components of the venom and said other components having in vitro coagulant activity are obtained;

E. eluting the column with a second elution medium different from said first elution medium and being selected from the group of elution medium having a pH of 6–7 or greater than 9; and having a molarity of 0.3 M or greater; and elution medium containing free arginine;

F. collecting eluate in subsequent portions until the elution of said in vivo anticoagulant enzyme absorbed in said column, together with less than 5% of protein components. are obtained.

4,027,013
CLOTTABLE FIBRINOGEN FREE FACTOR VIII AND ALBUMIN PRODUCT AND PROCESS

Rodger L. Bick, Los Angeles, and Lajos F. Fekete, Costa Mesa, both of Calif., assignors to William L. Wilson; Rodger L. Bick and Lajos F. Fekete, all of Santa Monica, Calif.

Filed Jan. 22, 1976, Ser. No. 651,614
Int. Cl.² A61K *35/14*; C07G *7/00*
U.S. Cl. 424—101 **13 Claims**

1. Process comprising:

selecting an admixture containing clottable fibrinogen and Factor VIII;

removing most of the clottable fibrinogen from said admixture to produce a clottable fibrinogen lean Factor VIII product;

concentrating said product to produce a concentrate;

admixing said concentrate with an amount of thrombin mimetic reagent sufficient to clot all of the clottable fibrinogen in said concentrate within approximately 24 hours without significantly impairing the potency of said Factor VIII, and allowing said clottable fibrinogen to form a clot;

separating said clot and retaining a clottable fibrinogen free Factor VIII concentrate;

admixing said retained clottable fibrinogen free Factor VIII

concentrate with an amount of human albumin sufficient to stabilize said Factor VIII; and

lyophilizing the resultant stabilized Factor VIII.

9. A lyophilized clottable fibrinogen free Factor VIII product comprising clottable fibrinogen free Factor VIII and human albumin and containing at least about 10 units of Factor VIII per milligram of albumin.

4,027,014

ANTIBIOTIC BN-130 SUBSTANCES AND THE PRODUCTION THEREOF

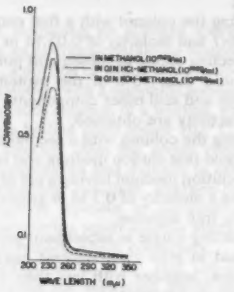
Norio Ezaki, Yokohama; Shoichi Amano, Kawasaki; Shinji Miyado, Yokohama; Mitsugu Ito, Kawasaki; Chuhei Nojiri, Yokohoma; Takashi Tsuruoka, Kawasaki; Yujiro Yamada, and Taro Niida, both of Yokohama, all of Japan, assignors to Meiji Seika Kaisha, Ltd., Tokyo, Japan

Filed Apr. 14, 1975, Ser. No. 567,867

Claims priority, application Japan, Apr. 17, 1974, 49-42267

Int. Cl.² A61K *35/74*

U.S. Cl. 424—122 **6 Claims**



1. BN-130 substance having an antibacterial activity to gram-negative and gram-positive bacteria as well as acid-fast bacteria; said substance being a colorless or faintly yellow colored oil which has no definite melting point, becomes ice-like in the vicinity of 0° C and is in the state of oil in the vicinity of 40° C; said substance being of acidic nature and having carboxylic group; said substance being soluble in methanol, ethanol, n-butanol, acetone, ethyl acetone and methyl isobutyl ketone and slightly soluble in benzene and chloroform but insoluble in water; showing an optical rotation of $[\alpha]_D^{25}$ minus 19.2° in its 1% methanolic solution; being positive to potassium permanganate reaction and iodine reaction but negative to ninhydrin reaction, silver nitrate reaction, Sakaguchi reaction and ferric chloride reaction; giving an elemental analysis C 65.24%, H 8.79%, N 4.85% and O 21.12% (balance); showing a molecular weight of 520 as determined by the titration method and a molecular weight of 550 as calculated from the determination of the vapor pressure of methyl ester of said substance; having ultraviolet absorption spectra corresponding to those shown in FIG. 1 and an infrared absorption spectrum pelleted in potassium bromide corresponding to that shown in FIG. 2; and giving an R_f value of 0.45 in thin layer chromatography on silica gel with ethyl acetate-methanol (20:1 by volume) and an R_f value of 0.23 in the same thin layer chromatography on silica gel with chloroformisopropanol (9:1 by volume), or a pharmaceutically acceptable salt of the BN-130 substance.

4,027,015

ANTIBIOTIC 67-121, A POLYENE ANTIFUNGAL ANTIBIOTIC PRODUCED BY *ACTINOPLANES CAERULEUS*

Marvin J. Weinstein; Gerald H. Wagman, both of East Brunswick; Joseph A. Marquez, Montclair, and Mahesh G. Patel, Belleville, all of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Continuation-in-part of Ser. No. 450,040, March 11, 1974, abandoned. This application June 9, 1975, Ser. No. 585,289

Int. Cl.² A61K *35/00*

U.S. Cl. 424—119 **6 Claims**

1. A process for preparing Antibiotic 67–121 complex as defined in claim 5, which comprises cultivating Antibiotic 67–121 producing species of *Actinoplanes caeruleus* having the indentifying characteristics of NRRL 5325 in an aqueous nutrient medium having assimilable sources of carbon and nitrogen under aerobic conditions until a composition of matter having substantial antifungal activity is produced and extracting Antibiotic 67–121 complex therefrom.

3. A polyene antibiotic complex designated Antibiotic 67–121 complex and having in free form substantially the following characteristics: C = 56.14, H = 7.53 and N = 1.79, M.P.° C = 175, Rf = 0.43, ultra-violet absorption maxima in methanol at 342, 363, 382 and 403 mμ with corresponding $E_{1cm}^{1\%}$ values of 340, 475, 667 and 605, infra red absorption maxima in mineral oil at 3350, 1725 and 1665 cm^{-1} and nuclear magnetic resonance spectra in hexa-deutero-dimethylsulfoxide with maxima at 2.75, 6.56 and 7.64 ppm, said complex being in free form.

4,027,016

EVERNINOMICIN ANTIBACTERIAL DERIVATIVES, ELECTROCHEMICAL METHOD FOR THEIR MANUFACTURE, METHOD FOR THEIR USE AS ANTIBACTERIAL AGENTS, AND PHARMACEUTICAL COMPOSITIONS USEFUL THEREFOR

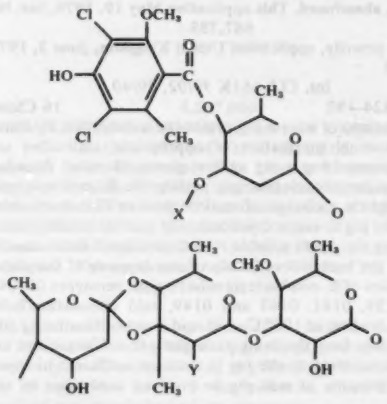
Peter Kabasakalian, Bloomfield; Sami Y. Kalliney, Parsippany; Ashit K. Ganguly, Upper Montclair, and Anita Westcott, Montclair, all of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Filed Jan. 19, 1976, Ser. No. 650,081

Int. Cl.² A61K *31/715*

U.S. Cl. 424—180 **11 Claims**

10. The method of eliciting an antibacterial response in a warm-blooded animal having a susceptible bacterial infection, which comprises administering to said animal a non-toxic, antibacterially effective amount of a member selected from the group consisting of an everninomicin derivative devoid of nitrogen represented by the following formula, and the pharmaceutically acceptable phenolic mono-cationic salts and N-methylglucamine acid addition salts thereof:



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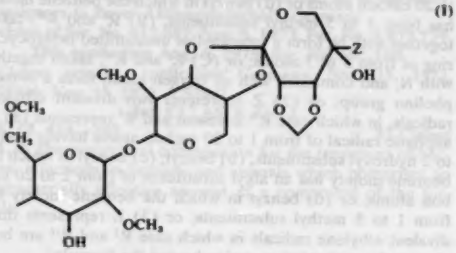
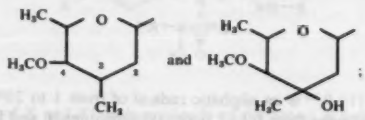


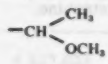
(I)

wherein X is a member selected from the group consisting of



Y is a member selected from the group consisting of hydrogen and hydroxyl;

Z is a member selected from the group consisting of



and hydrogen provided Y is hydrogen; and said pharmaceutically acceptable salts are salts of the phenol substituent in said everninomicin derivative.

4,027,017

METHOD OF TREATING ALCOHOLISM

Shun-ichi Hata, Yokohama; Koji Mizuno, Tokorozawa; Yasuho Nishii, Niiza; Etsuko Mitsuishi, Tokyo, and Motoharu Shiba, Ohmiya, all of Japan, assignors to Chugai Seiyaku Kabushiki Kaisha, Tokyo, Japan

Filed July 7, 1975, Ser. No. 593,444

Claims priority, application Japan, July 16, 1974, 49-80795

Int. Cl.² A61K *31/675*

U.S. Cl. 424—200 **17 Claims**

1. A method of reducing the alcohol content of the blood and the accumulation of neutral lipids in the liver following the intake of alcoholic drinks, which comprises orally administering to a patient in need of said therapy a pharmaceutical composition comprising an effective amount of a uridine diphosphate glucuronic acid as an active ingredient, and a pharmaceutically acceptable carrier, just before or at the time of intake of alcoholic drinks.

10. A method of reducing the alcohol content of the blood and the accumulation of neutral lipids in the liver following the intake of alcoholic drinks, which comprises intravenously or intramuscularly injecting in a patient in need of such therapy a pharmaceutical composition in the form of a parenteral injection comprising an effective amount of a uridine diphosphate glucuronic acid as an active ingredient and a pharmaceutically acceptable carrier, just before or at the time of intake of alcoholic drinks.

4,027,018

COMBATTING PESTS WITH O-ETHYL-S-N-PROPYL-O-(SUBSTITUTED PHENYL)-PHOSPHOROTHIOLATES

Shigeo Kishino, Tokyo; Akio Kudamatsu, and Kozo Shiokawa, both of Kanagawa, all of Japan, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

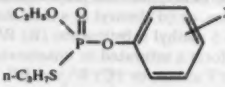
Division of Ser. No. 448,587, March 6, 1974, Pat. No. 3,954,919, which is a division of Ser. No. 208,902, Dec. 16, 1971, Pat. No. 3,839,511. This application Oct. 31, 1975, Ser. No. 628,459

Claims priority, application Japan, Dec. 26, 1970, 45-118740

Int. Cl.² A01N *9/36*

U.S. Cl. 424—210 **10 Claims**

1. A method of combatting insects, acarids, or nematodes which comprises applying to the insects, acarids or nematodes or to an insect, acarid or nematode habitat an insecticidally, acaricidally or nematocidally effective amount of a phosphoric acid ester of the formula



wherein

at least one X is nitro, cyano, lower alkylmercapto, lower alkylsulfinyl, lower alkoxycarbonyl, or lower alkylcarbonyl, and the others if present may also be halogen or lower alkyl, and

m is 1, 2 or 3.

4,027,019

3-OXIMES OF D-17α-ETHYNYL-19-NORTESTOSTERONE ESTERS AND METHOD

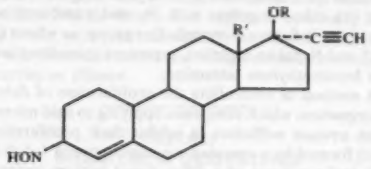
Arvin Pranlal Shroff, Piscataway, N.J., assignor to Ortho Pharmaceutical Corporation, Raritan, N.J.

Continuation-in-part of Ser. No. 598,966, July 24, 1975, abandoned. This application Jan. 23, 1976, Ser. No. 652,000

Int. Cl.² C07J *1/00*

U.S. Cl. 424—238 **19 Claims**

13. A method of suppressing fertility comprising administering to a female animal an effective antifertility amount of a compound in the D series of Claim 1 of formula:



wherein R is alkanoyl of from 2 to 10 carbon atoms and R′ is a member selected from the group consisting of methyl and ethyl, whereby fertility is suppressed.

4,027,020

RANDOMLY TERMINATED CAPPED POLYMERS

Harold A. Green, Havertown, Pa.; John J. Merianos, Jersey City, and Alfonso N. Petrocci, Glen Rock, both of N.J., assignors to Millmaster Onyx Corporation, New York, N.Y.

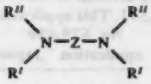
Continuation-in-part of Ser. No. 518,596, Oct. 29, 1974, Pat. No. 3,931,319. This application Sept. 4, 1975, Ser. No. 610,168

Int. Cl.² A01N *9/00, 9/22;* **C07C** *85/00, 87/30*

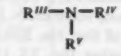
U.S. Cl. 424—248.56 **6 Claims**

1. A product formed by a one-step reaction between 1,4-dihalo-2-butene and a mixture of a difunctional tertiary amine with a monofunctional tertiary amine, the molar ratio of the difunctional amine to the monofunctional amine being from

about 2:1 to 30:1, the number of moles of the 1,4-dihalo-2-butene being about equal to the sum of the number of moles of the difunctional tertiary amine plus one-half the number of moles of the monofunctional amine, the reaction being effected at a temperature of between about 50°–70° C and during a time interval of between about 1 to 10 hours, the difunctional tertiary amime having the formula:

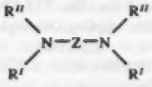


wherein Z represents either (1) a divalent aliphatic radical of from 2 to 10 carbon atoms containing from 0 to 2 hydroxyl substituents and from 0 to 2 ethylenic double bonds, and R^I and R^{II} may either be (A) the same or different and may be either (a) an alkyl group of from 1 to 20 carbon atoms having from 0 to 2 hydroxyl substituents, (b) benzyl, (c) benzyl in which the benzene moiety has one alkyl substituent of from 2 to 20 carbon atoms, or (d) benzyl in which the benzene moiety has from 1 to 5 methyl substituents; (B) R^I and R^{II}, taken together with N, form a saturated or unsaturated heterocyclic ring of from 5 to 7 atoms; or (C) R^I and R^{II}, taken together with N, and combined with an oxygen atom, form a N-morpholino group; or (2) Z represents two divalent ethylene radicals, in which case R^{II} is absent and R^I represents (a) an aliphatic radical of from 1 to 20 carbon atoms having from 0 to 2 hydroxyl substituents, (b) benzyl, (c) benzyl in which the benzene moiety has an alkyl substituent of from 2 to 20 carbon atoms; or (d) benzyl in which the benzene moiety has from 1 to 5 methyl substituents; or (3) Z represents three divalent ethylene radicals in which case R^I and R^{II} are both absent; and the monotertiary amine having the formula:

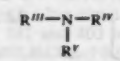


where (1) R^{III} is an aliphatic radical of from 1 to 20 carbon atoms, having from 0 to 2 hydroxyl substituents, and R^{IV} and R^V may either be (a) the same or different and represent an aliphatic radical having from 1 to 4 carbon atoms with from 0 to 1 hydroxyl substituents, (b) taken together with N to form a saturated or unsaturated heterocyclic ring of from 5 to 7 atoms; (c) taken together with N, and combined with an oxygen atom to form a N-morpholino group; or where (2) R^{III}, R^{IV}, R^V and N, taken together, represent quinoline, isoquinoline or hexamethylene tetramine.

4. A method of controlling the proliferation of deleterious microorganisms which comprises applying to said microorganisms an amount sufficient to inhibit their proliferation of a product formed by a one-step reaction between 1,4-di-halo-2-butene and a mixture of a difunctional tertiary amine with a monofunctional tertiary amine, the molar ratio of the difunctional amine to the monofunctional amine being from about 2:1 to about 30:1, the number of moles of the 1,4-di-halo-2-butene being about equal to the sum of the number of moles of the difunctional tertiary amine plus one-half the number of moles of the monofunctional amine, the reaction being effected at a temperature of between about 50°–70° C and during a time interval of between about 1 to 10 hours; the difunctional tertiary amine having the formula:



wherein Z represents either (1) a divalent aliphatic radical of from 2 to 10 carbon atoms containing from 0 to 2 hydroxyl substituents and from 0 to 2 ethylenic double bonds, and R^I and R^{II} may either be (A) the same or different and may be either (a) an alkyl group of from 1 to 20 carbon atoms having from 0 to 2 hydroxyl substituents, (b) benzyl, (c) benzyl in which the benzene moiety has one alkyl substituent of from 2 to 20 carbon atoms or (d) benzyl in which the benzene moiety has from 1 to 5 methyl substituents; (B) R^I and R^{II}, taken together with N, form a saturated or unsaturated heterocyclic ring of from 5 to 7 atoms; or (C) R^I and R^{II}, taken together with N, and combined with an oxygen atom, form a N-morpholino group; or (2) Z represents two divalent ethylene radicals, in which case R^{II} is absent and R^I represents (a) an aliphatic radical of from 1 to 20 carbon atoms having from 0 to 2 hydroxyl substituents, (b) benzyl, (c) benzyl in which the benzene moiety has an alkyl substituent of from 2 to 20 carbon atoms; or (d) benzyl in which the benzene moiety has from 1 to 5 methyl substituents; or (3) Z represents three divalent ethylene radicals in which case R^I and R^{II} are both absent; the monotertiary amine having the formula:



where (1) R^{III} is an aliphatic radical of from 1 to 20 carbon atoms, having from 0 to 2 hydroxyl substituents, and R^{IV} and R^V may be either (a) the same or different and represent an aliphatic radical having from 1 to 4 carbon atoms with from 0 to 1 hydroxyl substituents; (b) taken together with N to form a saturated or unsaturated heterocyclic ring of from 5 to 7 atoms; (c) taken together with N, and combined with an oxygen atom to form a N-morpholino group; or where (2) R^{III}, R^{IV}, R^V and N, taken together, represent quinoline, isoquinoline or hexamethylene tetramine.

4,027,021

INTERFERON INDUCTION

Gerald E. Underwood, Charlestown Township, Kalamazoo County, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation-in-part of Ser. No. 500,052, Aug. 23, 1974, abandoned. This application Oct. 16, 1975, Ser. No. 623,185

Int. Cl.[2] A61K *31/535, 31/445, 31/135*

U.S. Cl. 424—248.56 **22 Claims**

1. A method for inducing interferon formation in an interferon producing animal in need of such treatment selected from the group consisting of humans, bovine, pigs, horses, sheep, mink, and fowl which comprises administering to said animal an amount effective to induce interferon formation in said animal of a compound selected from the group consisting of

a. 1,5-bis[(3-morpholinopropyl)amino]anthraquinone,

b. 1-[(2-aminoethyl)amino]-5-[[1-(hydroxymethyl)-propyl]amino]anthraquinone including primary-N-acylates, O-acylates, and O, primary-N-diacylates thereof, wherein the acylates are the acyl moiety of a carboxylic acid having from two to eighteen carbon atoms, inclusive,

c. 1,5-bis[[2-(diethylamino)ethyl]amino]anthraquinone,

d. 1,5-bis[[3-(diethylamino)propyl]amino]anthraquinone, and

e. 1,5-bis[(3-piperidinopropyl)amino]anthraquinone; or the pharmacologically acceptable acid addition salts thereof.

4,027,022
ANTIBACTERIAL BENZO-1,2,4-TRIAZINES

Florin Seng, Schildgen; Kurt Ley, Odenthal-Gloebusch, and Karl Georg Metzger, Wuppertal-Elberfeld, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

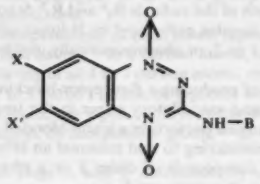
Division of Ser. No. 413,887, Nov. 8, 1973, Pat. No. 3,957,779. This application Aug. 5, 1975, Ser. No. 602,109

Claims priority, application Germany, Nov. 15, 1972, 2255946; Nov. 15, 1972, 2255947

Int. Cl.² A61K *31/53*

U.S. Cl. 424—249 **33 Claims**

1. A pharmaceutical composition for the treatment of bacterial infections in humans and animals which comprises an antibacterially effective amount of a compound of the formula:



wherein

each of X and X′, independently of the other, is hydrogen; halogeno, alkyl of 1 to 6 carbon atoms, unsubstituted or substituted by nitro, alkoxy of 1 to 5 carbon atoms, or up to 5 halogen atoms; or alkoxy of 1 to 6 carbons atoms, unsubstituted or substituted by halogeno or nitro; and

B is alkyl of 1 to 6 carbon atoms; alkenyl of 2 to 6 carbon atoms or benzyl

in combination with a pharmaceutically acceptable nontoxic inert, carrier.

4,027,023
CINNOLIN-3-YL CARBOXYLIC ACIDS AND DERIVATIVES

John Preston, and Michael John Cooper, both of Macclesfield, England, assignors to Imperial Chemical Industries Limited, London, England

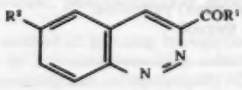
Filed July 28, 1975, Ser. No. 599,348

Claims priority, application United Kingdom, Aug. 19, 1974, 36360/74

Int. Cl.² C07D *231/28;* **A61K** *31/50*

U.S. Cl. 424—250 **7 Claims**

1. A pharmaceutical composition for the treatment of a syndrome or disease initiated by an antigen-antibody reaction comprising an effective amount of a compound of the formula:



VI

wherein R^1 stands for hydroxy, methoxy, ethoxy, 2-diethylaminoethoxy, phenoxy, hydroxyamino or 1,2,3,4-tetrazol-5-ylamino, and R^2 stands for ethyl, n-propyl, cyclohexyl, amino, acetylamino, phenyl, p-chlorophenyl, dinitrophenyl, chloro or bromo, or a pharmaceutically-acceptable salt thereof, and an inert pharmaceutically-acceptable diluent or carrier.

4. A method for the treatment of a syndrome or disease initiated by an antigen-antibody reaction in a host in need of said treatment, which comprises administering to said host a functionally-effective amount of a compound of the formula I as defined in claim 1, or a pharmaceutically-acceptable salt thereof, and an inert pharmaceutically-acceptable diluent or carrier.

4,027,024
PHARMACEUTICAL COMPOSITION HAVING SYNERGISTIC ANALGESIC ACTIVITY

József Knoll; Zsuzsanna Fürst; Zoltán Mészaros; Péter Szentmiklósi; Ágoston Dávid; István Hermecz; Attila Mandi, all of Budapest; Rezsö Bognár; Sándor Makleit, both of Debrecen; Gyula Valovics, Tiszavasvari; László Szávik, Tiszavasvari, and Sándor Nagy, Tiszavasvari, all of Hungary, assignors to Chinoin Gyogyszer-es Vegyeszeti Termekek Gyara RT, Budapest, Hungary

Continuation-in-part of Ser. No. 415,749, Nov. 14, 1973, Pat. No. 3,954,986. This application Jan. 15, 1976, Ser. No. 649,237

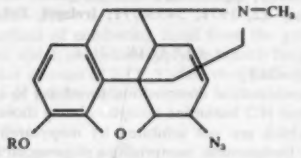
Claims priority, application Hungary, Dec. 19, 1972, CI 1322

The portion of the term of this patent subsequent to May 4, 1993, has been disclaimed.

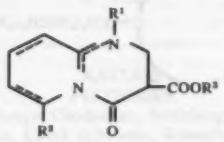
Int. Cl.² A61K *31/485, 31/505*

U.S. Cl. 424—251 **8 Claims**

1. A pharmaceutical composition of synergistic analgesic activity comprising one part of an azidocompound of the formula



or a salt thereof, wherein R is hydrogen, methyl, ethyl or acetyl and 20 to 1000 parts of a pyrimidazolium compound of the formula



wherein R^1, R^2 and R^3 are hydrogen or lower alkyl with 1 to 6 carbon atoms and the dotted lines represent optionally hydrogenated bonds, or a pharmaceutically acceptable sale or quaternary salt thereof in admixture with a suitable inert solid or liquid carrier or diluent.

4,027,025
8-AZAPURINE DERIVATIVES

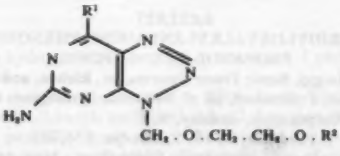
Howard John Schaeffer, Richmond, Va., assignor to Burroughs Wellcome Co., Research Triangle Park, N.C.

Filed Mar. 1, 1976, Ser. No. 662,901

Int. Cl.² C07D *487/04;* **A61K** *31/41*

U.S. Cl. 424—251 **31 Claims**

1. The compound of the formula



wherein

R^1 is hydroxyl or amino

R^2 is a hydrogen atom or

R^2 is

where R^3 is a hydrogen atom, alkyl of 1 to 8 carbons, phenyl or naphthyl or a pharmaceutically acceptable salt thereof.

4,027,026
PHARMACEUTICAL COMPOSITIONS AND METHODS OF INHIBITING H-2 HISTAMINE RECEPTORS WITH PYRIDYL SUBSTITUTED THIOALKYL- AND OXYALKYL-THIOUREAS AND UREAS

Graham John Durant, Welwyn Garden City; John Colin Emmett, Codicote, and Charon Robin Ganellin, Welwyn Garden City, all of England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, England

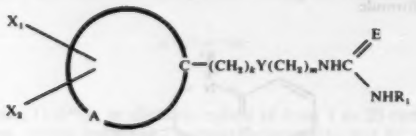
Division of Ser. No. 450,937, March 13, 1974, Pat. No. 3,905,984, which is a continuation-in-part of Ser. No. 290,584, Sept. 20, 1972, abandoned, which is a continuation-in-part of Ser. No. 230,451, Feb. 29, 1972, abandoned. This application June 13, 1975, Ser. No. 586,670

Claims priority, application United Kingdom, Mar. 9, 1971, 6352/71; July 22, 1971, 34334/71; Ireland, Feb. 3, 1972, 136/72

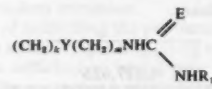
Int. Cl.² A61K *31/44*

U.S. Cl. 424—263 **13 Claims**

1. A pharmaceutical composition to inhibit H-2 histamine receptors, said H-2 histamine receptors being those histamine receptors which are not inhibited by mepyramine but are inhibited by burimamide, comprising a pharmaceutical carrier and in an effective amount to inhibit said receptors a pyridyl compound of the formula:



wherein A is such that there is formed together with the carbon atom show a pyridine ring; X_1 is hydrogen, lower alkyl, hydroxyl, trifluoromethyl, halogen, amino or



X_2 is hydrogen or, when X_1 is lower alkyl, lower alkyl or halogen; k is 0 to 2 and m is 2 or 3, provided that the sum of k and m is 3 or 4; Y is oxygen or sulphur; E is oxygen or sulphur; R_1 is hydrogen, lower alkyl, benzoyl or di-lower alkylamino- lower alkyl, or a pharmaceutically acceptable addition salt thereof.

4,027,027
PYRIDYLOXYALKYLENEAMINO-PHENOXY-PROPANOL-2-COMPOUNDS

Knut A. Jaeggi, Basel; Franz Ostermayer, Riehen, and Herbert Schroter, Fullinsdorf, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

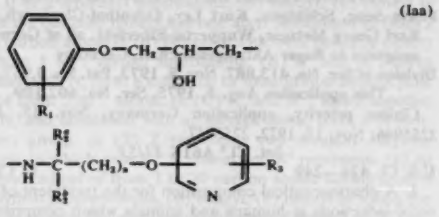
Filed May 5, 1975, Ser. No. 574,785

Claims priority, application Switzerland, May 14, 1974, 6582/74

Int. Cl.² A61K *31/395*; C07D *213/56*

U.S. Cl. 424—266 **28 Claims**

1. A compound of the formula



(Iaa)

wherein R_1 denotes lower alkyl, lower alkenyl, hydroxyl, lower alkoxy, lower alkenyloxy, halogen, carbamoyl, lower alkylcarbamoyl, lower alkanoylamino or lower alkoxycarbonylamino-lower alkyl, each of the radicals R_2^a and R_2^b denotes hydrogen or methyl, R_3 denotes carbamoyl or N-lower alkylcarbamoyl and *n* denotes 1 or 2, or pharmaceutically usable salts of such compounds.

25. Method of producing a β-receptor-blocking, bloodpressure lowering and vasodilatory effect in the treatment of arrythmias and angina pectoris in a warm-blooded animal which comprises administering to said mammal an effective amount of one of the compounds of claim 1 or a pharmaceutically usable salt of such a compound.

4,027,028
ARYLETHERS AND PHARMACEUTICAL COMPOSITIONS

Michel Vincent, Bagneux; Georges Remond, Versailles, and Michel Laubie, Vaucresson, all of France, assignors to Science Union et Cie, France

Filed Nov. 10, 1975, Ser. No. 630,145

Int. Cl.² C07D *211/58*

U.S. Cl. 424—267 **14 Claims**

1. The aryloxy lower alkyl piperidines selected from the group consisting of

-N-(2,6 dichlorophenoxy) ethyl 4-(N′-phenyl N′-propionylamino) piperidine;
-N-(2,6-dimethyl phenoxyethyl) 4-N′-phenyl N′-propionylamino) piperidine;
-N-(2,6-dimethoxy phenoxyethyl) 4-(N′-phenyl N′-propionylamino) piperidine;
-N-(2,6-dimethyl phenoxypropyl) 4-(N′-phenyl N′-propionylamino) piperidine;
-N-[2-(2,6-dimethyl phenoxy) propyl] 4-N′-phenyl N′-propionylamino piperidine;
-N-(2,6-dimethyl phenoxyethyl) 4-[N′-phenyl N′-(dipropylacetylamino)] piperidine;
-N-(2,6-dimethyl phenoxyethyl) 4-[N′(3,4-methylene dioxyphenyl) N′-propionylamino] piperidine;
-cis dl N-(2,6 dimethyl phenoxyethyl) 3-methyl 4-(N′-phenyl N′-propionylamino) piperidine;

and addition salts thereof.

4,027,029
DIAZEPINE DERIVATIVES

André Gagneux, Basel; Roland Heckendorn, Arlesheim, and René Meier, Buus, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

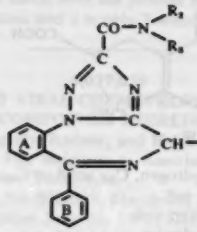
Division of Ser. No. 328,815, Jan. 31, 1973, Pat. No. 3,870,714. This application Dec. 23, 1974, Ser. No. 535,480

Claims priority, application Switzerland, Feb. 7, 1972, 1738/72; Aug. 31, 1972, 12843/72; Nov. 3, 1972, 16045/72

Int. Cl.² A61K *31/41*, *31/445*, *31/495*, *31/535*

U.S. Cl. 424—269 **8 Claims**

1. The method for the treatment of states of agitation and tension in a warm blooded animal which comprises administering to said animal an effective amount of a compound of the formula



wherein

R_1 represents hydrogen, or an alkyl group having 1 to 3 carbon atoms, and

R_2 and R_3 independently of each other, represent hydrogen, alkyl groups having 1 to 6 carbon atoms, or hydroxyalkyl groups having in all 4 to 7 carbon atoms, or aralkyl groups having 7 to 9 carbon atoms, or together with the adjacent nitrogen atom, the 1-pyrrolidinyl-, piperidino-, 4-methyl-1-piperazinyl, or morpholino group;

wherein

each of the rings A and B independently of the other, is unsubstituted or substituted by one member of the group consisting of halogen up to atomic number 35, trifluoromethyl or nitro groups,

its 5-oxide or a pharmaceutically acceptable acid addition salt thereof.

4,027,030

CERTAIN THIAZOLE-CARBOXAMIDES AND THEIR PHARMACEUTICAL UTILITY

Andre Poittevin, Vaires-sur-Marne; Robert Fournex, Paris, and Michele Dagnaux, Fontenay-sous-Bois, all of France, assignors to Roussel-UCLAF, Paris, France

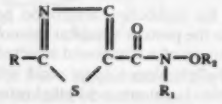
Filed Feb. 20, 1976, Ser. No. 659,760

Claims priority, application France, Feb. 28, 1975, 75.06247; Dec. 12, 1975, 75.39703

Int. Cl.² C07D *277/30*

U.S. Cl. 424—270 **15 Claims**

1. A compound of the formula



wherein R, R_1 and R_2 are individually selected from the group consisting of hydrogen and alkyl of 1 to 6 carbon atoms and their non-toxic, pharmaceutically acceptable acid addition salts

11. A method of inducing hypoglycemic and antilipolytic activities in humans comprising administering to humans hypolgycemically and antilipolytically effective amounts of at least one compound of claim 1.

4,027,031

2-CYCLOPROPANECARBOXAMIDO-S-HALOTHIAZOLE AS ANTI-INFLAMMATORY AGENTS

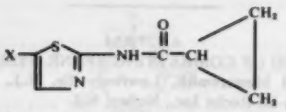
Jack R. DeBaun, Sunnyvale; Ferenc M. Pallos, Walnut Creek, and Don R. Baker, Orinda, all of Calif., assignors to Stauffer Chemical Company, Westport, Conn.

Continuation-in-part of Ser. No. 572,241, April 28, 1975, abandoned. This application Apr. 14, 1976, Ser. No. 676,770

Int. Cl.² A61K *31/425*

U.S. Cl. 424—270 **5 Claims**

1. A method of treatment of an inflammatory condition in a mammal comprising administering to said mammal a therapeutically effective amount of 2-cyclopropanecarboxamido-S-halothiazole having the following structural formula:



in which X is chloro, bromo, iodo or fluoro.

4,027,032

COMBATING HEMINTHOSPORIUM FUNGI WITH 2-[3',5'-DIMETHYLPYRAZOLYL-(1')]-BENZIMIDAZOLE

Paul-Ernst Frohberger, Leverkusen, and Walter Gauss, Cologne, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

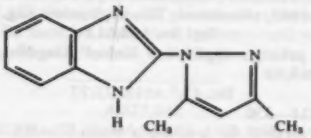
Filed Oct. 30, 1975, Ser. No. 627,412

Claims priority, application Germany, Nov. 9, 1974, 2453210

Int. Cl.² A01N *9/22*

U.S. Cl. 424—273 **5 Claims**

1. A method of combating fungi from the genus Helminthosporium which comprises applying to such fungi a fungicidally effective amount of 2-[3',5'-dimethylpyrazolyl-(1')]-benzimidazole of the formula



4,027,033

PESTICIDES

Madhukar Subraya Chodnekar, Seltisberg; Peter Loeliger, Munchenstein; Ulrich Schwieter, Reinach; Albert Pfiffner, Bulach; Milos Suchy, and Rene Zurfluh, both of Pfaffhausen, all of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

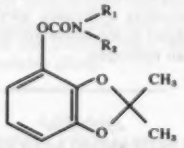
Filed Mar. 3, 1976, Ser. No. 663,386

Claims priority, application Switzerland, Mar. 18, 1975, 3421/75; Dec. 22, 1975, 16586/75

Int. Cl.² A61K *31/36;* C07D *317/44*

U.S. Cl. 424—282 **11 Claims**

1. A compound represented by the



wherein

R_1 is hydrogen or lower alkyl containing 1–4 carbon atoms and

R_2 is halo-lower alkanoyl or dihalo-lower alkanoyl, said lower alkanoyls each containing 2–6 carbon atoms.

6. A pesticidal composition containing as the essential active ingredient a pesticidally effective amount of one or more compound of claim 1 in association with a compatible carrier material.

11. A method for providing a locus subject to or subjected to attack by pests free from such attack, which method com-

prises applying to said locus a pesticidally effective amount of a pesticidal composition of claim 6.

4,027,034

METHOD OF COMBATTING SWINE DYSENTERY

Robert Earl Messersmith, Lawrenceville, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Continuation-in-part of Ser. No. 471,372, May 20, 1974, Pat. No. 3,947,586. This application Feb. 24, 1976, Ser. No. 660,894

Int. Cl.² A61K *31/35*

U.S. Cl. 424—283 **5 Claims**

1. A method for the prevention of swine dysentery which comprises orally administering ad libitum to swine susceptible to swine dysentery a ration containing from about 0.0027% by weight to about 0.055% by weight of, as the active compound, a polyether antibiotic selected from monensin, or equivalent amount of a pharmaceutically acceptable salt or ester thereof.

4,027,035

THERAPEUTIC USES OF ADAMANTANEALKYLAMINE COMPOUNDS

Colin H. Cashin; Jiban K. Chakrabarti, both of Frimley, England, and Stephen S. Szinai, Gainsville, Fla., assignors to Eli Lilly and Company, London, England

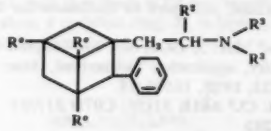
Division of Ser. No. 417,174, Nov. 19, 1973, Pat. No. 3,929,888, which is a continuation-in-part of Ser. No. 852,090, Aug. 21, 1969, abandoned. This application Aug. 28, 1975, Ser. No. 608,613

Claims priority, application United Kingdom, Aug. 27, 1968, 40968/68

Int. Cl.² A61K *31/27*

U.S. Cl. 424—330 **4 Claims**

1. The method for treating a warm-blooded mammal in need of treatment to control depression or Parkinsonism, which comprises administering to the mammal a therapeutically effective amount of an active agent, said active agent being a compound selected from the group consisting of (1) those compounds of the following formula and (2) their pharmaceutically acceptable acid addition salts:



I

wherein each R^e independently represents hydrogen or methyl; R^2 represents hydrogen or alkyl of C_1–C_4; and each R^3 independently represents hydrogen, alkyl of C_1–C_4, or (2-hydroxy-ethyl), subject to the limitation that at least one of R^2 and R^3 is other than hydrogen.

4,027,036

3-SUBSTITUTED PROPANOIC ACID DERIVATIVES AND PHARMACEUTICAL COMPOSITION

William Dawson, Camberley; Michael John Foulis, Binfield; Norman James Albert Gutteridge, Owlsmoor, and Colin William Smith, Bracknell, all of England, assignors to Lilly Industries, Ltd., London, England

Filed Apr. 10, 1974, Ser. No. 459,829

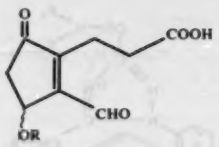
Claims priority, application United Kingdom, Apr. 12, 1973, 17736/73

Int. Cl.² A01N *9/24*; C07C *61/38*

U.S. Cl. 424—305 **6 Claims**

1. A compound selected from the group consisting of

1. the carboxylic acid of the formula



wherein R is hydrogen, C_{2-4} acryl or C_{2-4} haloacyl

2. its alkali metal salt;

3. its C_{1-4} alkyl ester; and

4. its C_{1-4} haloalkyl ester.

6. A pharmaceutical formulation in dosage unit form adapted for administration, comprising per dosage unit an effective amount within the range 1 to 150 mg/kg of animal body weight of a compound of claim 1, admixed with a pharmaceutically acceptable carrier therefor.

4,027,037

N-SUBSTITUTED β-AMINOCROTONIC ACID ESTERS

Peter Siegle, Cologne; Klaus Sasse, Schildgen, and Peter Rössler, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

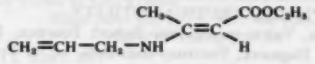
Filed Mar. 12, 1975, Ser. No. 557,698

Claims priority, application Germany, Mar. 26, 1974, 2414456

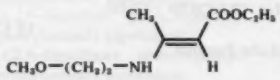
Int. Cl.² C07C *101/28*; A01N *9/20*

U.S. Cl. 424—314 **9 Claims**

1. A compound selected from the group consisting of β-allylaminocrotonic acid ethyl ester of the formula



and β-(2-methoxyethylamino)-crotonic acid ethyl ester of the formula



5. A method for combating arthropod pests which comprises applying to the pests or a habitat thereof a metamorphosis inhibitory amount of a compound selected from the group consisting of β-allylaminocrotonic acid ethyl ester, β-(2-methoxyethylamino)-crotonic acid ethyl ester, β-(2-ethylhexylamino)-crotonic acid ethyl ester, or β-(tert.-butylamino)-crotonic acid ethyl ester.

4,027,038

COMPLEMENT INHIBITORS

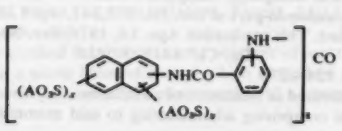
Seymour Bernstein, New City, N.Y., and Robert Herman Lenhard, Paramus, N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed May 10, 1976, Ser. No. 684,600

Int. Cl.² A61K *31/185*

U.S. Cl. 424—315 **18 Claims**

1. A method of inhibiting the complement system in a body fluid which comprises subjecting said body fluid to the action of an effective complement inhibiting amount of a compound of the formula:



wherein x is 1 or 2; y is zero or 1; and A is hydrogen, alkali metal or alkaline earth, with the proviso that A is identical in the same compound and x is only 2 when y is zero.

4,027,039
METHOD OF VIRAL CHEMOPROPHYLAXIS AND COMPOUNDS THEREFOR

Charles Paul Hegarty, Radnor, and Helen C. Pietryk, Havertown, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 808,989, March 20, 1969, abandoned. This application June 26, 1975, Ser. No. 590,543

Int. Cl.² A61K *31/155*

U.S. Cl. 424—326 **5 Claims**

1. A method of controlling a virus infection in a host suffering from a virus infection in which the virus is a member of the group consisting of Herpes simplex, Vaccinia, Influenza A(PR8), Influenza A_1 (Ann Arbor), Influenza A_2(Taiwan), Influenza B (Mass.), Influenza B (Maryland), Mengo, Columbia SK polio, and Neurovaccinia comprising orally administering to the animal host from 250 picograms to 250 micrograms per kilogram of host body weight of a compound selected from the group consisting of:

A. Aminoguanidine

B. guanidine

C. 1(sec-Butylideneamino) guanidine and the pharmaceutically acceptable acid addition salts thereof.

4,027,040
NOVEL BENZOPHENONE DERIVATIVES

Roger Deraedt, Pavillons-sous-Bois; Christian Marchandeau, Claye-Souilly, and Jean Meier, La Varenne Saint-Hilaire, all of France, assignors to Roussel-UCLAF, Paris, France

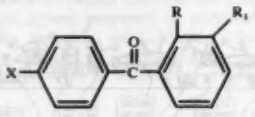
Filed Nov. 7, 1975, Ser. No. 629,706

Claims priority, application France, Nov. 28, 1974, 74.38981

Int. Cl.² A01N *9/24*; C07C *49/80*

U.S. Cl. 424—331 **17 Claims**

1. A benzophenone of the formula



wherein R is alkyl of 1 to 5 carbon atoms, X is halogen and R_1 is an aliphatic hydrocarbon of the formula

$$-(CH_2)_a-CH_2-CH_2-(CH_2)_b-H \text{ or}$$
$$-(CH_2)_a-CH=CH-(CH_2)_b-H$$

wherein a and b are whole numbers between 0 and 5 and their sum is not greater than 5.

12. An analgesic composition comprising an effective amount of at least one compound of claim 1 and a pharmaceutical carrier.

4,027,041
ETHYL- AND VINYLBENZENES AS ANTITHROMBOTIC AGENTS

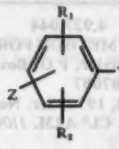
Erwin A. Stephan, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Division of Ser. No. 577,975, May 15, 1975, Pat. No. 3,975,542. This application May 26, 1976, Ser. No. 690,222

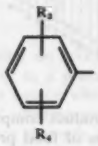
Int. Cl.² A61K *31/015*, *31/03*, *31/085*

U.S. Cl. 424—340 **24 Claims**

1. A method of treating vascular thrombosis in warm-blooded animals which comprises administering to a warm-blooded animal in need of such treatment an amount effective for treating vascular thrombosis of a compound of the formula,



wherein Y is a monovalent group which is either ethyl or vinyl; $R_1$and R_2 are monovalent groups independently selected from the group consisting of hydrogen, halo, C_1–C_3 alkyl, and C_1–C_3 alkoxy, and Z is either a monovalent group which is C_5–C_7 cycloalkyl, with the provisos that at least one of R_1 and R_2 must be other than hydrogen and when Y is ethyl, R_1 and R_2 must be other than halo, or a group of the formula,



wherein R_3 and R_4 are monovalent groups independently selected from the group consisting of hydrogen, halo, C_1–C_3 alkyl, and C_1–C_3 alkoxy, with the provisos that at least one of R_1, R_2, R_3, R_4 must be other than hydrogen and when Y is ethyl, R_1, R_2, R_3, and R_4 must be other than halo.

4,027,042
COLOR EXTRACT FROM BEETS AND METHOD FOR THE PREPARATION OF SAME

Joachim von Elbe, and Clyde H. Amundson, both of Madison, Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.

Continuation of Ser. No. 514,647, Oct. 15, 1974, abandoned. This application June 11, 1976, Ser. No. 695,104

Int. Cl.² A23L *1/277*

U.S. Cl. 426—51 **24 Claims**

1. The process of treating beets to recover beet pigment in a concentration and form suitable for use as a vegetable coloring agent, comprising the steps of reducing the beets to an insoluble phase and an aqueous phase in which the beet pigment along with other soluble carbohydrates, nitrates, nitrites and proteins are present in the dissolved state, subjecting the water soluble portions of the beets to carbohydrate fermentation with or without prior separation of the insoluble phase, whereby soluble carbohydrates, and some crude proteins are converted to insoluble fermentation reaction products while the beet pigment remains in the dissolved state in the aqueous phase, and separating the soluble phase containing the beet pigment from the insoluble phase.

4,027,043
SOLID ANIMAL FEED SUPPLEMENT

Jack J. Schroeder, Rolling Hills, and Milo D. Appleman, Los Angeles, both of Calif., assignors to Jack J. Schroeder, Rolling Hills, Calif.

Filed Oct. 28, 1975, Ser. No. 625,938

Int. Cl.² A23K *1/22*

U.S. Cl. 426—69 **19 Claims**

1. A solid animal feed supplement comprising molasses, and solidifying ingredients added thereto as a soluble phosphate or phosphoric acid in an amount from 0.5 to about 5 weight percent expressed as P_2O_5, and an oxide or salt of a metal selected from the class consisting of aluminum, magnesium, calcium or mixtures thereof, in an amount from 0.5 to about

5 weight percent, expressed as the oxide with a proportion of equivalent weights of phosphate to metal from 1 to about 4, sufficient to solidify said supplement into solid block form.

4,027,044

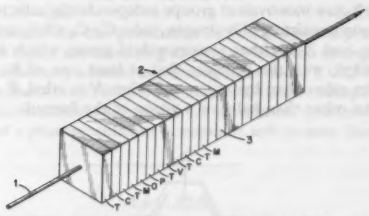
FOOD PRODUCT AND METHOD FOR PREPARING SAME

Lawrence Huntington Taylor, P.O. Box 49-58, 48th St. P.O. Br., Union City, N.J. 07087

Filed June 8, 1976, Ser. No. 693,748

Int. Cl.² A23L *1/00*

U.S. Cl. 426—134 **3 Claims**



1. A skewered food product comprising a skewer and two basically different groups of food products, a first group of absorbent bakery products, and a second food group selected from the group consisting of meat, cheese, vegetable, and combinations thereof, said second food group producing some liquids or aromatics during cooking; said food products of both groups being sliced in variable thickness, but of exactly similar sized and straight-sided geometrical shape in plan view from the axis of the skewer, with such specially formed slices being arranged sequentially along the skewer and alternating from said absorbent slices to the slices of said second group and back to the absorbent slices so that for the length of the skewer the different types of food product lie next to and in contact with one another permitting and facilitating the absorbtion and retention by the absorbent slices of the various flavors, liquids and aromatics produced by the second grouping of sliced materials, with all slices being arranged on the skewer so that their exterior edges match and lie in exactly the same plane, thus producing a skewered product with flat sides most suitable for either pan frying by contact heat or by broiling, as either cooking process is preferred or dictated by circumstance, with no loss of benefit by the use of either cooking means.

4,027,045

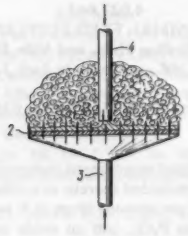
PROCESS FOR PREPARING OXYGENATED COCKTAIL

Igor Mikhailovich Fedotkin, ulitsa Stepana Khalturina, 19, kv. 9; Anatoly Konstantinovich Jukhimets, ulitsa Kosmicheskaya, 5, kv. 82, and Leonid Panteleimonovich Odery, prospekt Voroshilova, 9, kv. 201, all of Kiev, U.S.S.R.

Filed Feb. 3, 1975, Ser. No. 546,982

Int. Cl.² C02D *1/02*

U.S. Cl. 426—312 **1 Claim**



1. A process for preparing oxygenated cocktails comprising the steps of continuously supplying a foam-forming beverage as a beverage layer less than 5 mm thick but in sufficient amounts to make an oxygenated cocktail and continuously dispersing oxygen gas which is free of all other gas except at most 1% nitrogen into the beverage layer, such that the beverage layer forms a foam and rises above newly supplied foam-forming beverage, to form an upper layer about the newly supplied foam-forming beverage.

4,027,046

FINING WITH ALUMINATE-MODIFIED SILICA SOL

Benno Bohm, Leverkusen; Hermann Genth, Krefeld-Bockum; Peter Schober, Cologne, and Peter Simons, Schildgen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Feb. 11, 1975, Ser. No. 549,119

Claims priority, application Germany, Feb. 23, 1974, 2408896

Int. Cl.² A23B *7/00*; C12G *1/00, 1/02*

U.S. Cl. 426—330.3 **6 Claims**

1. In the fining of a fruit juice or a grape or fruit wine or a must therefor in unfremented, partially fermented or fermented form, wherein a flocculant is added to said beverage, and the deposit formed is separated off, the improvement which comprises adding an aluminate-modified silica sol to said beverage as said flocculant, whereby protein removing and flocculation occur more readily than with unmodified silica sol.

4,027,047

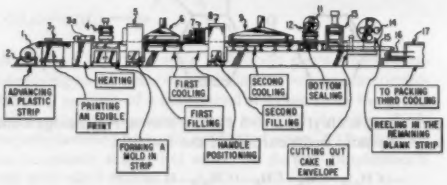
PROCESS OF PRODUCING HYGIENICALLY WRAPPED, PRINTED AND MOLDED CHOCOLATE CAKES IN ENVELOPES SIMULTANEOUSLY FUNCTIONING AS DISPLAY COVERS

Kyujiro Harima, Osaka, Japan, assignor to Sisco Co. Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 295,096, Oct. 5, 1972, abandoned. This application Nov. 21, 1974, Ser. No. 525,875

Int. Cl.² B65B *9/00*; A23P *1/00*

U.S. Cl. 426—383 **3 Claims**



1. A process of mass-producing a plurality of wrapped, printed, hygienically molded chocolate edible cakes with a continuously advanced top plastic film strip simultaneously functioning during the process as a print carrier and mold for each said cake, and at completion of the process as a display cover and envelope for each said cake, comprising the steps of:

A. advancing a continuously fed elongated plastic film strip to be subjected to a sequence of steps in a plurality of spaced identical areas to be printed, each said area having the approximate width of an individual cake in its future envelope;

B. printing on said film on each of said areas, with an edible ink, a pattern located in registration with the area of each individual cake subsequently deposited thereover;

C. forming in the film strip a mold for each cake to include each of the patterns printed on the film strip, respectively;

D. depositing into each said mold a fluid congealable edible chocolate mass which is adhesive to the pattern thus

printed; positioning a handle into and partly protruding from said edible mass in each mold;

E. cooling the mold to congeal the mass with the printed pattern attached; thereby forming an individual cake,

F. sealing the open exposed side of each said mold to thus completely envelope each said cake; and

G. cutting from the advancing strip, each mold with its cake sealed therewithin to form discrete packages; each discrete sealed package including the protruding portion of its respective handle.

4,027,048

ELECTROSTATOGRAPHIC DEVELOPMENT

Richard G. Crystal, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 214,481, Dec. 30, 1971, Pat. No. 3,974,078. This application Apr. 12, 1976, Ser. No. 676,279

Int. Cl.² B05D *1/06*; G03G *13/08*, *13/20*

U.S. Cl. 427—14 **13 Claims**

1. An electrostatographic imaging process comprising forming an electrostatographic latent image and developing said image with a toner material, said toner comprising dry particulate toner particles comprising a colorant selected from the group consisting of pigments and dyes, an electro-photographic resin, said resin comprising at least one soft deformable polymer encapsulated in a matrix of at least one tough polymer, said soft polymer being encapsulate in the tough polymer matrix in a plurality of discrete domains, said soft polymer being selected from the group consisting of alkyl acrylate polymers in which the alkyl group has from 1–12 carbon atoms, alkylmethacrylate polymers in which the alkyl group has from 4–12 carbon atoms, siloxane polymers, lactone polymers, vinyl acetate polymers, alkylene oxide polymers, and unsaturated diene polymers, and said tough polymer being selected from the group consisting of styrene polymers including polystyrene, poly halo styrene, poly alkyl styrenes, styrene-n-butylmethacrylate copolymers; polymers of alkylmethacryalates wherein the alkyl group has from 1–3 carbon atoms; polymers of acrylonitrile; polymers of vinyl halides, including vinyl chloride polymers; polyamides, polyesters, polymers of acrylic acids; polymers of methacrylic acids; polymers of vinyl-N-alkyl pyridene; and poly carbonates.

4,027,049

PROCESS FOR ELECTROSTATIC DIRECT TRANSFER PRINTING OF DESIGNS ON FABRICS

Yougoro Masuda, Takatsuki; Takashi Sato, Settsu, and Shigeru Kawase, Hirakata, all of Japan, assignors to Kanebo, Ltd., Tokyo, Japan

Filed Aug. 14, 1975, Ser. No. 604,865

Claims priority, application Japan, Aug. 26, 1974, 49-98189

Int. Cl.² B05D *1/28*, *3/14*

U.S. Cl. 427—19 **29 Claims**

1. A process for electrostatically printing a design on fabrics which comprises forming an electrostatic latent image corresponding to the design on a photoconductive material or an insulating dielectric material, developing the latent image with a toner comprising at least one chargeable resin and at least one colorant, transferring the developed toner image directly to a fabric having a surface inherent resistivity, as measured at a temperature of 20° C and a relative humidity of 65%, of about 1×10^8 to about 1×10^{14} ohms, and fixing the toner image to the fabric.

4,027,050

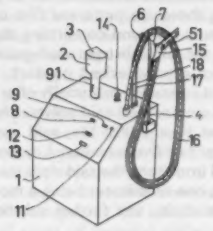
METHOD AND APPARATUS FOR ELECTROSTATIC COATING

Frederic David Haig, 265 Queens Pde., Clifton Hill, Victoria, Australia (3068)

Filed July 10, 1975, Ser. No. 594,852

Int. Cl.² B05B *5/02*; B05D *1/06*

U.S. Cl. 427—27 **12 Claims**



1. A method of coating an article comprising passing a coating material adjacent to a plurality of conductors connected to a high voltage source whereby to electrostatically charge the material and wherein each of the conductors is connected to said source through an impedance having a magnitude sufficient to resist reduction of charge on a connector relatively remote from an article to be coated in consequence of reduction of charge on a conductor relatively adjacent to said article to be coated.

3. A method as claimed in claim 1 including periodically reducing the charge at the conductors whereby to periodically reducing the charge at the conductors whereby to periodically vary the electrostatic charge applied to the material.

4,027,051

METHOD OF PRODUCING HOMOGENEOUSLY DOPED N-TYPE SI MONOCRYSTALS AND ADJUSTING DOPANT CONCENTRATION THEREIN BY THERMAL NEUTRON RADIATION

Konrad Reuschel, Vaterstetten; Manfred Schnoeller, Haimhausen; Alfred Muehlbauer, Sauerlach; Eberhard Spenke, Pretzfeld, and Wolfgang Keller, Munich, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Dec. 6, 1974, Ser. No. 530,347

Claims priority, application Germany, Dec. 14, 1973, 2362264

Int. Cl.² B05D *3/06*

U.S. Cl. 427—35 **1 Claim**

1. A method of producing homogeneously doped silicon monocrystals having n-conductivity, comprising:

providing a silicon monocrystal having a precisely determined total concentration of a dopant therein throughout the mass of said monocrystal but wherein the concentration of dopant randomly fluctuates along the length and width of such monocrystal; and

subjecting said monocrystal to controlled thermal neutron irradiation, said thermal neutrons having an average energy level such that approximately one P^{31} atom is created per 6000 thermal neutrons per square centimeter per second, and so that the reaction:

$$Si^{30}(n, \gamma)\, Si^{31} \rightarrow P^{31}$$

occurs within said monocrystal to such an extent that the amount of so-produced phosphorus atoms within such monocrystal is at least a factor of two times larger than the precisely determined total concentration of dopant in the silicon monocrystal prior to neutron irradiation.

4,027,052
FABRICATION OF IRON OXIDE PATTERN

Larry Flack Thompson, Gillette, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Division of Ser. No. 358,728, May 9, 1973, Pat. No. 3,920,454.
This application July 2, 1975, Ser. No. 592,366
Int. Cl.² B05D 3/02, 3/06
U.S. Cl. 427—43 10 Claims

1. A procedure for the fabrication of an article including a substrate having thereon a patterned film comprising at least one oxidized iron compound comprising the steps of:

depositing on the said substrate a solvent solution consisting essentially of a polymerized product, the said polymerized product consisting essentially of at least one addition polymer of a monomer, said polymer having a molecular weight of at least 3,000 Mv, said monomer consisting essentially of two five-membered carbonaceous rings and a π-bonded iron atom, the said rings including at least one substituent, one substituent being a mono-olefinic hydrocarbon side chain, any further substituents being saturated;

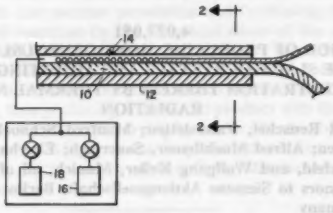
removing solvent thereby leaving a residuum consisting essentially of a layer of dried polymer product;

oxidizing the said layer so as to convert substantially all of the dried polymer product, thereby producing a film comprising at least one compound consisting of an oxide or iron, said procedure including a procedural step resulting in patterning of the said film.

4,027,053
METHOD OF PRODUCING POLYCRYSTALLINE SILICON RIBBON

Israel A. Lesk, Scottsdale, Ariz., assignor to Motorola, Inc., Chicago, Ill.

Filed Dec. 19, 1975, Ser. No. 642,523
Int. Cl.² B05D 5/12; C01B 33/02
U.S. Cl. 427—53 6 Claims



1. A method of producing a ribbon of polycrystalline semiconductor material comprising:

providing a moving surface having disposed thereon a layer of particulate semiconductor silicon;

providing a gaseous silicon source;

heating said particulate silicon to a temperature sufficient to deposit silicon.

contacting said gaseous silicon source with said particulate semiconductor silicon said temperature to deposit silicon from said source onto said silicon, said deposit of silicon joining said particulate semiconductor silicon together thereby forming a continuous, coherent ribbon of semiconductor material.

4,027,054
APERTURED BELT CONVEYING

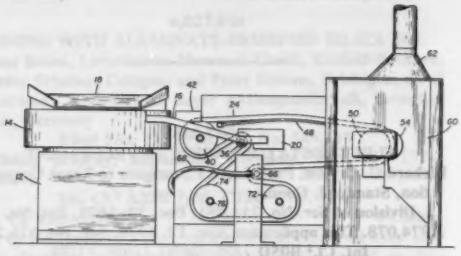
Robert F. Porod, Cicero, Ill., assignor to Western Electric Company, Inc., New York, N.Y.

Filed Oct. 20, 1975, Ser. No. 624,138
Int. Cl.² B05D 1/02, 5/12
U.S. Cl. 427—79 4 Claims

1. A method of solder coating the ends of roll capacitor blanks carried in a flexible belt having longitudinally spaced apertures extending transversely therethrough and slits extending angularly from the apertures to one flat surface of the belt to form pairs of flexible flaps enclosing the apertures comprising:

loading roll capacitor blanks into the apertures in the belt;

flexing the belt in a direction toward the slitted flat surface to move the angular slitted surfaces of the flaps over each other to constrict the apertures and form virtually continuous surfaces about the peripheries of the capacitor blanks;



advancing the belt to move the capacitor blanks to a work station;

spraying solder at the belt and roll capacitor blanks within the work station;

flexing the belt in a direction away from the slitted flat surface to slide and cam the angular slitted surfaces of the flaps over each other and enlarge the apertures; and

ejecting the solder-end-coated capacitor blanks from the enlarged apertures in the belt.

4,027,055
PROCESS OF TIN PLATING BY IMMERSION

Frederick W. Schneble, Jr., Oyster Bay, N.Y., assignor to Photocircuits Division of Kollmorgan Corporation, Hartford, Conn.

Division of Ser. No. 382,056, July 24, 1973, Pat. No. 3,917,486. This application Apr. 14, 1975, Ser. No. 567,603
Int. Cl.² B05D 5/12; C09D 5/00
U.S. Cl. 427—98 30 Claims

1. A process for depositing a smooth, even tin coating on a metallized surface, said process comprising immersing into a tin plating bath comprising

a soluble stannous salt, a sulfur component which comprises a mixture of alkali metal polysulfides and at least one other sulfur-containing compounds, a mineral acid, and a wetting agent, wherein said alkali metal polysulfides are present in sufficient amount to produce said smooth, even coating

an article having a metallized surface capable of chemically displacing tin from the tin plating bath, wherein the article is immersed in the bath until tin forms in a continuous coating on said metallized surface.

4,027,056
FABRICATION OF AN IRON OXIDE FILM

Larry Flack Thompson, Gillette, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Division of Ser. No. 358,728, May 9, 1973, Pat. No. 3,920,454.
This application July 2, 1975, Ser. No. 592,367
Int. Cl.² B05D 3/02, 3/04
U.S. Cl. 427—226 6 Claims

1. A procedure for the fabrication of an article including a substrate having thereon a film comprising at least one oxidized iron compound comprising the steps of:

depositing on the said substrate a solvent solution consisting essentially of a polymerized product, the said polymerized product consisting essentially of at least one addition polymer of a monomer, said polymer having a molecular

weight of at least 3,000 Mv, said monomer consisting essentially of two five-membered carbonaceous rings and a π-bonded iron atom, the said rings including at least one substituent, one substituent being a mono-olefinic hydrocarbon side chain, any further substituents being saturated;

removing solvent thereby leaving a residuum consisting essentially of a continuous layer of dried polymer product;

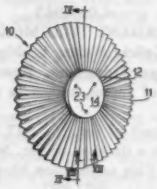
oxidizing the said layer so as to convert substantially all of the dried polymer product, thereby producing a film comprising at least one compound consisting of an oxide of iron.

4,027,057

SUNBURST WALL PLAQUE OR THE LIKE AND METHOD OF MAKING THE SAME

Victor N. Grumbeck, Bristol, Wis., assignor to Beauti-Vue Products Corporation, Bristol, Wis.

Filed Dec. 24, 1975, Ser. No. 644,075
Int. Cl.² B32B *3/00*
U.S. Cl. 428—32 **14 Claims**



1. A sunburst plaque, or the like, comprising:

a body having a sunburst array of radially extending slats which are torsionally resiliently flexible about their longitudinal axes;

means connecting said slats to one another along their radially extending sides;

the radially inner ends of the slats being in face-to-face relation, and the slats being progressively divergent from one another form adjacent to said inner ends toward their radially outer ends;

said slats being torsionally resiliently flexed about their longitudinal axes progressively from adjacent to their radially inner ends toward their outer ends;

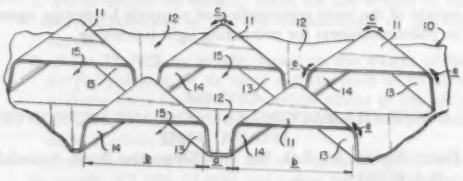
and means securing the radially inner ends of the slats for stabilizing the body.

4,027,058

FOLDED STRUCTURAL PANEL

William A. Wootten, 425 Via Corta, Malaga Cove Plaza, Palos Verdes Estates, Calif. 90274

Filed July 23, 1975, Ser. No. 598,484
Int. Cl.² B32B *3/28;* **B31D** *5/04*
U.S. Cl. 428—36 **26 Claims**



1. A structural medium comprising a folded sheet of material defining an array of closely adjacent projections and depressions each of which comprises an integral folded portion of said sheet and each of which has a triangular shape in a direction parallel to the plane of said sheet, the edges of each triangular depression being bounded by the edges of three adjacent triangular projections disposed in surrounding relation to said depression, the sheet of material adjacent at least two edges of each of said triangular projections extending continuously from said two edges in a direction transverse to the plane of said sheet ot define transverse side walls which merge into the corresponding edges of the adjacent triangular depressions, the adjacent apices of the three triangular projections which surround each apex of one of said triangular depressions being spaced from one another by a distance comprising a fraction of the length of each side of said projections, said triangular projections respectively having planar top surfaces of triangular shape which are spaced from one another in generally coplanar relation to one another and which cooperate to define a first discontinuous substantially planar surface comprising one side of said structural medium, and said triangular depressions respectively having planar bottom surfaces of triangular shape which are spaced from one another in generally coplanar relation to one another and which cooperate to define a second discontinuous substantially planar surface comprising the other side of said structural medium, said sheet of material defining a plurality of elongated open slots disposed in spaced relation to one another and extending respectively along one edge of each of said triangular projections, each of said slots freely spacing said one edge of its associated projection from the corresponding edge of the adjacent triangular depression.

4,027,059

ASPHALT-BASED COMPOSITIONS

Russell E. Koons, El Dorado, Ark., assignor to Lion Oil Company, El Dorado, Ark.

Filed Oct. 14, 1975, Ser. No. 621,666
Int. Cl.² C08L *95/00;* **F16L** *58/10*
U.S. Cl. 428—36 **19 Claims**

1. A composition comprising (a) at least one non-air-blown, solvent extracted asphalt having a penetration of about 0 to about 100 and a softening point of about 220° to about 110° F.,; (b) at least one polyhydroxy compound containing 3 to 15 carbon atoms and two or three hydroxyl groups; (c) at least one intermediate polyhydroxyl polymer having an average of at least 1.8 predominantly primary, terminal, allylic hydroxyl groups per molecule and being an addition polymer of 0 to about 75% by weight of an alpha-olefinic monomer of two to about twelve carbon atoms, and about 25 to 100% of a 1,3-diene hydrocarbon of 4 to about 12 carbon atoms, said intermediate polymer having a viscosity at 30° C of about 5 to about 20,000 poises, the majority of its unsaturation in the main carbon chain, and a number average molecular weight of about 400 to about 25,000; (d) at least one hydrocarbon solvent; and (e) at least one polyamine.

4,027,060

RUBBER ARTICLES HAVING IMPROVED SLIP COATINGS

Pascal E. Esemplare, Mountainside, N.J., and Dennis Beeferman, Brooklyn, N.Y., assignors to Sutures, Inc., Coventry, Conn.

Continuation-in-part of Ser. No. 405,863, Oct. 12, 1973, Pat. No. 3,919,442. This application June 24, 1975, Ser. No. 589,677
The portion of the term of this patent subsequent to Nov. 11, 1992, has been disclaimed.
Int. Cl.² B32B *25/08;* **A41D** *19/00;* **B32B** *25/12*
U.S. Cl. 428—212 **21 Claims**

1. An article comprising a rubber surface provided with an adherent slip coating of a synthetic polymer latex composition consisting essentially of about 5 to 95% by weight of a film-forming, non-elastomeric synthetic polymer component (1) having an elongation of at least about 200% and about 95 to 5% of a normally solid, non-elastomeric, synthetic polymer component (2) exhibiting an elongation of below about 20% and a coefficient of friction of up to about 0.20, each of said

polymer component (1) and (2) being normally solid polymers having a molecular weight of at least about 25,000 and said slip coating having an elongation of at least about 200 up to 700%, a coefficient of friction of up to about 0.25 and a thickness of below about 0.005 inch.

9. An article comprising a rubber surface provided with an adherent slip coating of a synthetic polymer latex composition consisting essentially of about 5 to 95% by weight of a film-forming, non-elastomeric synthetic polymer component (1) having an elongation of at least about 200% selected from the group consisting of:

a. vinyl chloride-alkyl acrylate copolymer
b. vinylidene chloride-alkyl acrylate copolymer
c. vinyl acetate-alkyl acrylate copolymer
d. polyvinyl chloride-polyalkylacrylate admixture
e. polyvinylidene chloride-polyalkylacrylate admixture
f. polyvinyl acetate-polyalkylacrylate admixture

and about 95 to 5% of a normally solid, non-elastomeric synthetic polymer component (2) exhibiting an elongation of below about 20% and a coefficient of friction of up to about 0.20 selected from the group consisting of:

a. vinyl chloride-vinyl ester copolymer
b. vinylidene chloride-vinyl ester copolymer
c. polyvinyl chloride-polyvinyl ester admixture
d. polyvinylidene chloride-polyvinyl ester admixture

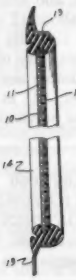
said slip coating having an elongation of at least about 200 up to 700%, a coefficient of friction of up to about 0.25 and a thickness of below about 0.005 inch.

4,027,061

LAMINATED SAFETY GLASS

George E. Cartier, Springfield, and James A. Snelgrove, Monson, both of Mass., assignors to Monsanto Company, St. Louis, Mo.

Filed Nov. 18, 1975, Ser. No. 632,933
Int. Cl.² B32B 17/10, 27/08
U.S. Cl. 428—213 14 Claims



1. A laminated glazing unit comprising in laminated combination:

a. a glass sheet,
b. a plastic interlayer material selected from the group consisting of polyvinyl butyral and polyurethane; and
c. a nitrile polymer film having a nitrile monomer content of at least 55 percent by weight wherein the nitrile monomer is selected from the group consisting of acrylonitrile and methacrylonitrile

wherein the surface of the nitrile polymer which is laminated to the interlayer is coated with a silane selected from the group consisting of gamma-aminopropyl triethoxy silane and polyaminofunctional silane.

4,027,062

COMPOSITION AND METHOD FOR IMPARTING FIRE RESISTANCE AND WATER REPELLENCY TO FABRIC

John W. Engelbrecht, and John C. Lockard, both of New Haven, Mo., assignors to Kellwood Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 370,662, June 18, 1973, abandoned, which is a division of Ser. No. 268,041, June 30, 1972, abandoned. This application July 22, 1974, Ser. No. 490,796
Int. Cl.² B32B 27/04; B05D 3/12
U.S. Cl. 428—262 9 Claims

8. A fire resistant, water-repellent material comprising fabric having a substantially uniform dry coating on the surface thereof, said coating being derived from a molten coating composition comprising between about 5% and about 23% by weight of a liquid chlorinated paraffin, between about 20% and about 40% by weight of a resinous chlorinated paraffin, between about 4% and about 12% by weight of a copolymer of ethylene and vinyl acetate, between about 3% and about 18% by weight of a fire retardant, and up to about 15% by weight of an organic solvent.

4,027,063

FLAME RETARDANT THERMOSETTING RESIN

Yoshio Fujiwara; Keiichi Naito; Yoshinobu Fujimoto, all of Utsunomiya; Tooru Odashima, Kanuma, and Tomohiko Sada, Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 547,776, Feb. 7, 1975, abandoned, which is a division of Ser. No. 389,213, Aug. 17, 1973, abandoned. This application May 13, 1975, Ser. No. 577,087
Claims priority, application Japan, Sept. 14, 1972, 47-91746
Int. Cl.² B32B 17/02; C08F 222/04; C08L 63/00; G03C 5/00
U.S. Cl. 428—273 15 Claims

1. A flame retardant thermosetting resin composition essentially comprising (a) a liquid butadiene-containing resin having an average molecular weight of about 1000 to about 5000 and being selected from the group consisting of acryloyloxy- and methacryloyloxy-terminated homopolymer of butadiene and copolymer of butadiene with acrylonitrile or styrene that contain at least about 70 weight percent of butadiene, said butadiene-containing resin having from about 1.5 to about 3.0 terminating acryloyloxyl or methacryloyloxyl groups per molecule of said butadiene-containing resin, (b) between about 150 and 500 weight percent based on said butadiene-containing resin of one or more ethylenically unsaturated monomers each of which is copolymerizable with end vinyl groups of said terminating groups of said butadiene-containing resin and with at least one of said monomers containing halogen directly attached to aryl in an amount sufficient to provide from about 25 to about 70 weight percent based on said composition of said halogen directly attached to aryl, (c) between about 5 and about 20 weight percent based on said butadiene-containing resin of ethylenically unsaturated acid anhydride and (d) between about 0.1 and 2.0 weight percent, based on the total weight of the resin composition of peroxide hardening agents or photosensitizers for promoting light-hardening.

4,027,064

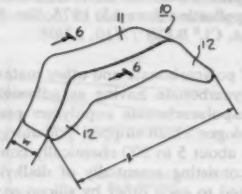
LOOSE FILL PACKING ELEMENT AND METHOD OF MAKING SAME

Harry Bussey, Jr., P.O. Box 115, Serpentine Road, Navesink, N.J. 07752

Continuation of Ser. No. 545,568, Jan. 30, 1975, abandoned. This application Apr. 30, 1976, Ser. No. 682,056
Int. Cl.² B32B 1/00, 3/00
U.S. Cl. 428—357 16 Claims

1. A loose fill packing element of expandable resilient thermoplastic material, said element being of generally block shape having a central section and at least a pair of end sec-

tions defining a generally block C-shape, each said end section extending from said central section to define an included



angle of greater than 90 °, said element having a transverse cross-section of substantially rectangular shape and being of a width (w) greater than the extruded length (l) thereof.

4,027,065
PRESSURE-SENSITIVE RECORD MATERIAL

Bruce W. Brockett, Appleton, Wis., and Frederick D. Weaver, Chillicothe, Ohio, assignors to NCR Corporation, Dayton, Ohio

Filed Apr. 28, 1975, Ser. No. 570,050
Int. Cl. B41m *5/00*
U.S. Cl. 428—307 **12 Claims**

1. Record sheet material comprising a paper sheet having a coating comprising encapsulated isolated droplets of an oil solution of a color-producing reactant material selected from the group consisting of a chromogenic dye-precursor material and an acidic co-reactant material capable of producing color when brought into reactive contact with a material selected from the group consisting of an acidic co-reactant material and a chromogenic dye-precursor, respectively, wherein said oil comprises 2, 2, 4-trimethyl-1, 3-pentanediol diisobutyrate and dissolves at least one percent of the chromogenic dye-precursor.

4,027,066
THERMOSETTING POWDER COATING COMPOSITION OF AN ACRYLIC POLYMER, DODECANEDIOIC ACID, CELLULOSE ACETATE BUTYRATE AND A CROSS-LINKING AGENT

Claus Victorius, Media, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 1, 1975, Ser. No. 636,794
Int. Cl.² B32B *15/08, 27/42;* C10M *5/10*
U.S. Cl. 428—334 **11 Claims**

1. A thermosetting polymer powder coating composition comprising finely divided particles having a particle size of about 1–100 microns; wherein the particles are an intimately mixed blend of constituents consisting essentially of about

A. 55–85% by weight of an acrylic polymer consisting essentially of

1. about 5–25% by weight, based on the weight of the acrylic polymer, of glycidyl methacrylate or glycidyl acrylate,
2. about 75–95% by weight, based on the weight of the acrylic polymer, of an alkyl methacrylate or an alkyl acrylate each having 1–12 carbon atoms in the alkyl groups or a mixture of said alkyl methacrylate and said alkyl acrylate; and

wherein the acrylic polymer has a weight average molecular weight of 5,000–15,000, and a glass transition temperature of 50°–98° C.;

B. 5–15% by weight of dodecanedioic acid;

C. 5–20% by weight of cellulose acetate butyrate having a viscosity of about 0.005–1.0 seconds measured according to ASTM-D-134356 at 25° C. and a butyryl content of about 25–60%;

D. 2–8% by weight of an alkylated melamine formaldehyde cross-linking agent having 1–4 carbon atoms in the alkyl group; and

E. 0.1–2.0% by weight of a blocked acid catalyst wherein the molar ratio of carboxyl groups of the dodecanedioic acid to epoxy groups of the acrylic polymer is about 0.8–1.5.

11. A metal substrate coated with a smooth, even coalesced layer about 0.5–6 mils in thickness of the powder coating composition of claim 1.

4,027,067
ANTI-BLOCKING TREATMENT FOR TACKY PARTICLE-FORM POLYMERS USING AQUEOUS COMPOSITION OF POLYHYDROCARBYLSILOXANE AND ALKALI METAL SALT OF HIGHER CARBOXYLIC ACID

Paul H. Wagner, and Mason S. Wilt, both of Borger, Tex., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Feb. 26, 1976, Ser. No. 661,682
Int. Cl.² B44D *1/22;* C08L *91/00*
U.S. Cl. 428—407 **32 Claims**

1. The process which comprises treating a normally-tacky particulate polymer with an anti-block composition comprising water, an alkali metal salt of a monocarboxylate containing at least 12 carbon atoms per molecule, and a normally fluid silicone which is a polyhydrocarbylsiloxane and thereafter removing the water,

wherein said anti-block composition contains about 1 to 50 weight percent silicone, and about 0.5 to 15 parts by weight alkali metal monocarboxylate per 100 parts by weight silicone, wherein said process provides about 0.005 to 1 part by weight silicone per 100 parts by weight polymer effective to substantially reduce the agglomerating tendencies of said particulate polymer under storage conditions.

4,027,068
USE OF CHITIN DERIVATIVES IN AUTOMOBILE PRODUCTS

Hosny Younes Saad, Ramsey, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed Sept. 12, 1975, Ser. No. 612,973
Int. Cl.² B32B *17/06;* C09K *3/18*
U.S. Cl. 428—426 **6 Claims**

1. A method for reducing the formation of fog on a transparent surface by disposing upon said surface a thin film of a carboxyl containing chitin derivative

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4,027,069
LAMINATED SAFETY GLASS PREPARED FROM BUFFERED ACETAL

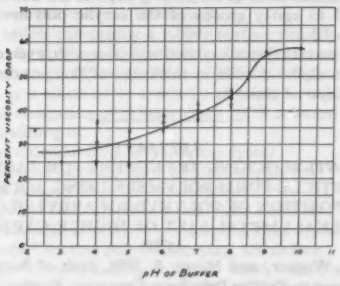
George E. Mont, Springfield, and James A. Snelgrove, Monson, both of Mass., assignors to Monsanto Company, St. Louis, Mo.

Filed Aug. 13, 1975, Ser. No. 604,400
Int. Cl.² B32B *17/10, 27/42*
U.S. Cl. 428—437 **16 Claims**

1. Laminated safety glass comprising at least one sheet of plasticized polyvinyl acetal resin laminated to at least one sheet of glass wherein the polyvinyl acetal contains an effective amount of a buffer, which when prepared as an aqueous solution has a pH in the range of from 3 to 7, in order to minimize changes in the viscosity of the polyvinyl acetal resin, wherein at least one component of the buffer is at least a bidentate ligand with the ability to interact with a metal to form a chelated ring structure and wherein the buffer is substantially free from hydrochloric, nitric and sulfuric acid components.

8. Laminated safety glass comprising at least one sheet of plasticized polyvinyl butyral resin laminated to at least one sheet of glass wherein the polyvinyl butyral contains from 20 to 20,000 parts per million of a buffer, which when prepared

as an aqueous solution has a pH in the range of from 3 to 7, in order to minimize changes in the viscosity of the polyvinyl butyral resin, wherein at least one component of the buffer is



at least a bidentate ligand with the ability to interact with a metal to form a chelated ring structure and wherein the buffer is substantially free from hydrochloric, nitric and sulfuric acid components.

4,027,070

STEEL PLATE FOR PREPARING CANS BY IRONING

Hidejiro Asano, and Shigeyoshi Maeda, both of Kitakyushu, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Mar. 5, 1975, Ser. No. 555,552
Claims priority, application Japan, Mar. 8, 1974, 49-26191
Int. Cl.[2] B32B *15/08, 15/18*
U.S. Cl. 428—341 **5 Claims**

1. A steel plate for preparing cans by ironing having on its surface a composite oil coating in an amount effective to avoid scratching or gashing of said steel plate surface consisting essentially of mineral oil and 3 to 50 parts of polyethylene having an average molecular weight from 500 to 30,000 and wherein the steel plate has on its surface under said composite oil layer, a layer of 0.2 to 10 $_{mg/dm^2}$ thickness of a substance selected from a group consisting of zinc phosphate, manganese phosphate, and iron phosphate.

4,027,071

FORMING SIZE FOR GLASS FIBERS

Donald L. Motsinger, Forest City; Charles E. Nalley, Shelby, and Joe B. Lovelace, Forest City, all of N.C., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 491,730, July 23, 1974, Pat. No. 3,933,711, which is a continuation-in-part of Ser. No. 302,611, Oct. 31, 1972, abandoned. This application Aug. 18, 1975, Ser. No. 605,577
Int. Cl.[2] C03C *17/32*
U.S. Cl. 428—392 **4 Claims**

1. A glass fiber containing on the surface thereof a coating residue obtained by drying on the surface of the glass fibers an aqueous sizing composition whose ingredients other than water consists essentially of: 70 to 90 percent by weight based on total weight of the size solution solids of a polyvinyl acetate film former; 4 to 7 percent by weight based on solids fatty acid amide lubricant; 3 to 6 percent by weight solids gamma-ethylene diamine propyl trialkoxy silane; and 2 to 6 percent by weight solids methacrylic acid chromic halide coupling agent; said sizing composition having been adjusted to a pH of about 6.2 to 6.4; and said composition having 7.0 to 7.5 percent by weight solids.

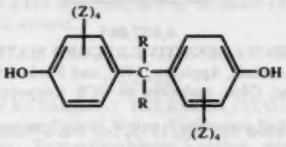
4,027,072

LAMINATES

Richard Edgar Molari, Jr., Pittsfild, Mass., assignor to General Electric Company, Pittsfield, Mass.

Continuation-in-part of Ser. No. 369,663, June 13, 1973, abandoned. This application June 13, 1975, Ser. No. 586,630
Int. Cl.[2] B32B *17/10, 27/08*
U.S. Cl. 428—412 **4 Claims**

1. A laminate of polycarbonate and other material selected from glass or polycarbonate having as adhesive interlayer block polysiloxane-polycarbonate copolymer prepared by a reacting (A) a halogen chain-stopped polydiorganosiloxane composed of from about 5 to 200 chemically combined diorganosiloxy units consisting essentially of dialkylsiloxy units which are connected to each other by silicon-oxygen-silicon linkages wherein each of the silicon atoms has two organo radicals attached through a carbon-silicon bond, and (B) a dihydric phenol having the formula



where Z is a member selected from the class consisting of hydrogen, lower alkyl radicals and halogen radicals and combinations thereof, and R is a member selected from the class consisting of hydrogen, hydrocarbon and halogenated hydrocarbon radicals, and phosgenating the purified reaction product until the resulting copolymer achieves a maximum intrinsic viscosity,

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4,027,073

PIGMENT-FREE COATING COMPOSITIONS

Harold A. Clark, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Division of Ser. No. 482,961, June 25, 1974, Pat. No. 3,986,997. This application June 21, 1976, Ser. No. 698,234
Int. Cl.[2] B32B *9/04*
U.S. Cl. 428—412 **20 Claims**

1. An article comprising a solid substrate coated with a pigment free coating composition comprising a dispersion of colloidal silica in lower aliphatic alcohol-water solution of the partial condensate of a silanol of the formula $RSi(OH)_3$ in which R is selected from the group consisting of alkyl radicals of 1 to 3 inclusive carbon atoms, the vinyl radical, the 3,3,3-trifluoropropyl radical, the gamma-glycidoxypropyl radical and the gamma-methacryloxypropyl radical, at least 70 weight percent of the silanol being $CH_3Si(OH)_3$, said composition containing 10 to 50 weight percent solids consisting essentially of 10 to 70 weight percent colloidal silica and 30 to 90 weight percent of the partial condensate, said composition containing sufficient acid to provide a pH in the range of 3.0 to 6.0.

4,027,074

PROCESS FOR PRODUCING FERROELECTRIC CRYSTALLINE MATERIAL

Leslie E. Cross; Raymond J. Kunz, and Robert E. Newnham, all of State College, Pa., assignors to Leco Corporation, St. Joseph, Mich.

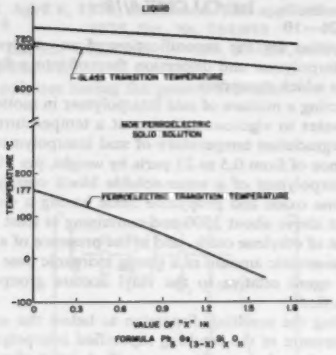
Filed Aug. 19, 1974, Ser. No. 498,695
Int. Cl.[2] C01G *17/00;* **B32B** *9/00*
U.S. Cl. 428—450 **6 Claims**

1. A process for producing a ferroelectric crystalline element, comprising the steps of:

1. forming a mass having the formula $Pb_5Ge_{3-x}Si_xO_{11}$, wherein x ranges from 0–2, in a glassy state;
2. heating said mass to a temperature between about 450° C

and the glass transition temperature of the composition to anneal the glassy mass into a crystalline mass; and

3. cooling the annealed mass while applying an electric field of about 15 to about 30 kilovolts/centimeter to a temperature below the ferroelectric transition temperature of the composition, to form a ferroelectric crystalline mass.



3. A process according to claim 1, wherein the operations of heating and cooling while applying an electric field are carried out with the mass situated on the surface of a conductive or semiconductive substrate.

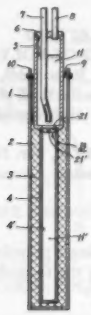
4. A ferroelectric crystalline element formed by the process in claim 3.

4,027,075

SODIUM SULFUR STORAGE BATTERY

Takashi Nakabayashi, and Hiroshi Kagawa, both of Takatsuki, Japan, assignors to Agency of Industrial Science & Technology, Tokyo, Japan

Filed Jan. 29, 1975, Ser. No. 545,310
Claims priority, application Japan, May 31, 1974, 49-60933
Int. Cl.² H01M *10/34*
U.S. Cl. 429—104 4 Claims



1. A sodium sulfur storage battery, which comprises

a tubular cell vessel;

a cover sealing said vessel;

a positive terminal post attached to said cover;

said vessel incorporating a reservoir;

a negative and terminal post extending through the cover of the reservoir and into said reservoir;

a cylindrical tube of solid electrolyte incorporating an anodic reactant into which said negative terminal post extends, said electrolyte tube being affixed to said reservoir at its upper end by glass solder,

an apertured partition covering the upper end of said solid electrolyte tube and connecting said solid electrolyte tube with the interior of said reservoir, said partition being in the form of a plate having an aperture with a diameter of between 20 μ and 200 μ;

an anodic chamber within said cylindrical tube of solid electrolyte, said anodic chamber being divided into a plurality of portions by means of round lateral partition walls each having an aperture with a diameter within the range 20 μ and 200 μ; and

a cathodic reactant arranged outside said solid electrolyte tube and within the cell vessel, said cathodic reactant being infiltrated in a graphite electron conductor filled between said electrolyte tube and said cell vessel,

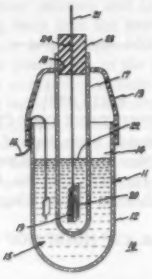
spaces being left above the cathodic reactant and the anodic reactant.

4,027,076

SEALED LITHIUM-SODIUM ELECTROCHEMICAL CELL

Gregory C. Farrington, Elnora, and Walter L. Roth, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Feb. 23, 1976, Ser. No. 660,259
Int. Cl.² H01M *4/36*
U.S. Cl. 429—104 5 Claims



1. A sealed lithium-sodium electrochemical cell comprises a casing, an anode positioned within the casing, the anode selected from the class consisting of lithium-sodium, lithium-sodium as an amalgam, and lithium-sodium in a non-aqueous electrolyte, the anode consisting of from 1.0 weight percent to 99.0 weight percent lithium and the balance being sodium, a cathode positioned within the casing, the cathode functioning with an anode selected from the class consisting of lithium-sodium, lithium-sodium as an amalgam, and lithium-sodium in a non-aqueous electrolyte and a solid lithium-sodium aluminate electrolyte, and a solid lithium-sodium aluminate electrolyte positioned within the casing between the anode and cathode, the solid lithium-sodium aluminate electrolyte having an approximate composition of $LiNaO{\cdot}9Al_2O_3$ of which 1.3 to 85.0 percent of the total alkali content is lithium.

4,027,077

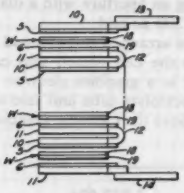
METHOD OF MAKING THERMAL BATTERIES AND BATTERIES, HAVING V_2O_5 ELECTRODE

Dmytro Shevchenko, Westminster, Md., assignor to Catalyst Research Corporation, Baltimore, Md.

Filed Sept. 4, 1963, Ser. No. 307,765
Int. Cl.² H01M *6/36*
U.S. Cl. 429—112 5 Claims

1. The method of making a thermal battery, comprising continuously moving a nickel strip lengthwise, coating substantially half of one surface of the travelling strip with a mixture of V_2O_5 and glaze-forming material and a liquid carrier to form a band along the strip, heating said band to melt it to form a glaze, cooling the glazed strip, coating the remainder of said surface of the nickel strip with a metal from the group consisting of Mg and Ca to form a band thereof along the strip beside the glaze, cutting battery plates from the

glazed half of the strip and from the bimetal half of the strip, and placing between a glazed plate and a bimetal plate a wafer having a V_2O_5 layer and an electrolyte layer, with the V_2O_5 layer engaging said glaze and with the coated side of the bimetal plate engaging the electrolyte layer.



4. A thermal battery comprising a wafer having a V_2O_5 layer and an electrolyte layer, a nickel cathode terminal plate, a glaze containing V_2O_5 on said plate engaging said V_2O_5 layer of the wafer, and a bimetal member consisting of a nickel anode terminal plate coated on one side with a metal from the group consisting of Mg and Ca, said coating metal engaging said electrolyte layer of the wafer.

4,027,078

LEAK-RESISTANT DRY CELLS

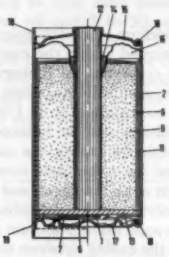
Ching W. Pun, and Ching C. Poon, both of Villa Viva, To Fung Shan Road, Shatin, New Territory, Kowloon, Hong Kong

Filed Oct. 16, 1975, Ser. No. 623,111

Claims priority, application United Kingdom, Oct. 17, 1974, 45042/74

Int. Cl.² H01M 6/00

U.S. Cl. 429—166 **7 Claims**



1. A method of making a cell comprising a negative electrode in the form of a zinc tube having a tongue extending from a sidewall of the tube, the tongue being in contact with a negative terminal of the cell, a dolly and electrolyte within the tube, a sealed, flexible bag of plastic material enclosing the tube with the tongue extending externally of the bag and in sealing relationship therewith, a cylindrical jacket surrounding the tube externally of the bag, and a positive carbon electrode extending through the bag in sealing relationship therewith and into the dolly; comprising the steps of:

a. placing the zinc tube, the dolly and the electrolyte within a soft, flexible bag of plastics material;

b. sealing the plastics bag closed to totally enclose the tube, dolly and electrolyte, with the tongue extending externally of the bag, and including sealing the tongue relative to the bag;

c. placing the cylindrical jacket about the tube externally of the bag;

d. inserting the carbon electrode into the dolly through the sealed bag; and

e. sealing the carbon electrode relative to the bag.

4,027,079

FINELY DIVIDED SAPONIFIED ETHYLENE-VINYL ACETATE INTERPOLYMERS

Dorothee M. McClain, Cincinnati, Ohio, and Betty L. Vest, Covington, Ky., assignors to National Distillers and Chemical Corporation, New York, N.Y.

Filed Apr. 1, 1975, Ser. No. 564,200

Int. Cl.² C08F 8/12

U.S. Cl. 526—10 **5 Claims**

1. A process for the saponification of an ethylene-vinyl acetate interpolymer and dispersion thereof into a finely divided form which comprises

a. subjecting a mixture of said interpolymer in molten form and water to vigorous agitation at a temperature below the degradation temperature of said interpolymer in the presence of from 0.5 to 25 parts by weight, per 100 parts of interpolymer of a water-soluble block copolymer of ethylene oxide and propylene oxide having a molecular weight above about 3500 and containing at least 50% by weight of ethylene oxide, and in the presence of at least a stoichiometric amount of a strong inorganic base saponifying agent relative to the vinyl acetate groups to be saponified;

b. Cooling the resulting dispersion to below the softening temperature of the resulting saponified interpolymer;

c. recovering the resulting saponified interpolymer and redispersing it in fresh water according to steps (a) and (b) without added saponifying agent at least once and until the amount of residual salt produced by said saponification reaction is less than about 0.1 weight percent based upon polymer and calculated as cation; and

d. recovering the saponified interpolymer of low residual salt level, and redispersing this interpolymer in fresh water according to steps (a) and (b) without added saponifying agent, to produce a finely divided dispersion thereof in which the particles are substantially spherical in shape, exhibit a number average particle size below about 10 microns, and are substantially devoid of particles in excess of about 25 microns in diameter.

4,027,080

CROSSLINKING OF POLYOLEFINES

Rudolf Amtmann, Munich; Hans Seidl, Grunwald, and Hansjoachim Twittenhoff, Strasslach, all of Germany, assignors to Peroxid-Chemie GmbH, Hollriegelskreuth, near Munich, Germany

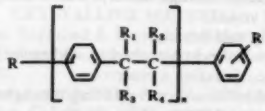
Filed Sept. 22, 1976, Ser. No. 725,370

Claims priority, application Germany, Oct. 13, 1975, 2545789

Int. Cl.² C08F 8/00; C08K 5/01; C08T 3/24

U.S. Cl. 526—12 **10 Claims**

1. A method of crosslinking a polyolefine in the presence of a crosslinking agent having the formula



wherein each R is selected from the group consisting of hydrogen, an alkyl group having from 1 to 6 C-atoms and an alkoxy group having 1 or 2 C-atoms, and R_1, R_2, R_3 and R_4 each is selected from the group consisting of hydrogen and an alkyl group having from 1 to 6 C-atoms, at least two of R_1, R_2, R_3 and R_4 being an alkyl group, and n is an integer from 1 to 5.

4,027,081
POLYMERIC COMPOSITIONS CONTAINING HYDROGEN BONDING COMPOUND

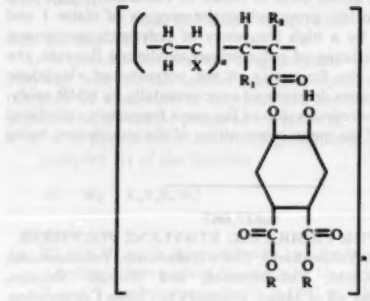
Stanley Turner, 849 N. Bruce, Apt. No. 1, Las Vegas, Nev. 89101

Continuation-in-part of Ser. No. 275,903, July 28, 1972, Pat. No. 3,876,671, which is a continuation-in-part of Ser. No. 26,094, April 6, 1970, abandoned. This application Feb. 28, 1975, Ser. No. 554,010

Int. Cl.² C08F 8/14, 214/06, 214/20, 218/14

U.S. Cl. 526—15 7 Claims

1. A polymer having the general formula



where

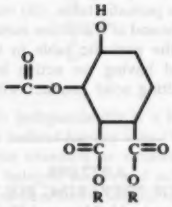
x is Cl or F

n is a value to provide an intrinsic viscosity of 0.6 to 2.4

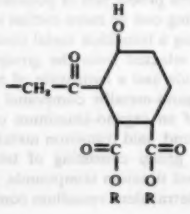
a is 1 to 400

R is an alkyl group having 1 to 18 carbon atoms

R_1 is H, COOH, COOR, and



R_2 is H, CH_3, CH_2COOR, CH_2COOH, and



4,027,082
POWDERY HYDROPHILIC FILLERS

Ivana Gavrilova, and Slavko Hudecek, both of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

Continuation-in-part of Ser. No. 372,997, June 25, 1973, abandoned. This application July 21, 1975, Ser. No. 597,559

Claims priority, application Czechoslovakia, June 26, 1972, 4518/72

Int. Cl.² C08F 8/44, 2/14

U.S. Cl. 526—15 12 Claims

1. A process for producing a powdered hydrophilic solid carboxylic-containing polymeric filler, which comprises providing a mixture of (a) at least one monomer comprising a mono- or poly-olefinically unsaturated mono- or poly-carboxylic acid, the anhydride thereof, or the acid chloride thereof and (b) at least 5% based on the weight of monomer (a) of a crosslinking monomer containing more than one vinyl group in an oxygen bearing organic solvent including (c) a free radical catalyst, polymerizing said monomer mixture for a time and at a temperature sufficient to form a particulate solid polymeric precipitate, said oxygen bearing organic solvent being a solvent for said monomers (a) and (b) but a non-solvent for said solid polymeric precipitate, the relative proportions of said monomer mixture and said oxygen bearing organic solvent being such that the particle size of said solid polymeric precipitate is less than 100 μm, directly treating said solid polymeric precipitate in the polymerization system with (d) a solution containing sodium, potassium or ammonium ions for a time sufficient to transform the solid polymeric precipitate into the corresponding solid polymeric salt, said solution being a non-solvent for said solid polymeric precipitate and its salt, and thereafter separating and drying said solid polymeric salt into a solid particulate powder.

4,027,083
MANUFACTURE OF POLYVINYLPYRROLIDONE-IODINE

Karl Herrle, Ludwigshafen; Walter Denzinger, Speyer; Kurt Seelert, and Wolfgang Schwarz, both of Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Aug. 7, 1975, Ser. No. 602,772

Claims priority, application Germany, Aug. 16, 1974, 2439197; May 28, 1974, 2523618

Int. Cl.² C08F 8/22

U.S. Cl. 526—23 9 Claims

1. A polyvinylpyrrolidone-iodine product which has been obtained by a process comprising:

a. the free radical polymerization of vinylpyrrolidone in a substantially anhydrous organic solvent selected from the group consisting of aromatic hydrocarbons and lower aliphatic monohydric alcohols of 1 to 4 carbon atoms, in the presence of free radicals supplied by an organic per-compound in an amount of about 0.5 to 5 percent by weight on the basis of the weight of the vinylpyrrolidone, and optionally in the presence of a complex salt or organic acid salt of a metal having an atomic number of from 23 to 29 as a co-activator;

b. mixing the resulting polyvinylpyrrolidone in the form of a powder with iodine in an amount of about 5 to 25% based on the total weight of the polyvinylpyrrolidone-iodine, at about room temperature up to about 50° C; and

c. heating the resulting mixture for about 5 to 20 hours at about 70° C. to 100° C.

4,027,084
POLYMERIC DIPHOSPHOROUS COORDINATES AND THEIR METAL DERIVATIVES
Igor Tkatchenko, Caluire, France, assignor to Societe Nationale des Petroles d'Aquitaine, Paris, France
Filed July 7, 1975, Ser. No. 593,184
Claims priority, application France, July 5, 1974, 74.23445
Int. Cl.² C08F *8/40, 8/42*
U.S. Cl. 526—27 12 Claims

1. The method for preparing a polymeric diphosphine coordinate which comprises the step of contacting an alkali metal or alkaline earth metal alcoholate of diphosphine of the formula:

$$Ph_2P(CH_2)_nCH(CH_2)_nPPh_2$$
$$|$$
$$OMa$$

wherein Ma is an alkali metal or alkaline earth metal and *n* is 1 to 4, dissolved in a solvent, with a halogenated polymer suspended in a liquid.

4,027,085
APPARATUS FOR CONTROLLING OPERATIONAL PARAMETERS IN POLYMERIZATION EQUIPMENT AND RELATED METHOD
Clyde C. Clemmer, and Ward C. Alcorn, III, both of Odessa, Tex., assignors to Dart Industries Inc., Los Angeles, Calif.
Continuation of Ser. No. 302,175, Oct. 20, 1972, abandoned, which is a continuation of Ser. No. 53,355, July 9, 1970, abandoned. This application May 19, 1975, Ser. No. 578,582
Int. Cl.² C08F *10/02*
U.S. Cl. 526—61 5 Claims

1. In a process for carrying out an exothermic chemical reaction on a sustained basis wherein a key, reaction rate controlling reactant is gradually introduced as a positive flow delivery stream into an elongated reaction zone over a considerable period of time, the improvement which comprises

a. electrically sensing the temperatures at a plurality of stations in said reaction zone spaced apart through a portion of same just downstream from a point of introduction of said key reactant,

b. passing the resultant plurality of separate electrical signals simultaneously through matching amplification circuits and converging said amplified signals into a gating circuit which transmits only the peak signal while cutting off all of the rest, and

c. transmitting said peak signal back to control means on the driving element of said positive flow delivery stream which in response to said peak signal adjusts the rate of introduction of said key reactant in a compensating manner so as to restrict variations in said signal from a selected target value.

4,027,086
PROCESS FOR PREPARING ELASTOMERIC COPOLYMERS OF VINYLIDENE FLUORIDE AND THE ELASTOMERIC COPOLYMERS OBTAINED THEREBY
Ernesto Lo Valvo, Peschiera Borromeo, (Milan); Gianfranco Diotallevi, and Carlo Laganà, both of Milan, all of Italy, assignors to Montedison S.p.A., Milan, Italy
Filed Aug. 7, 1975, Ser. No. 602,800
Claims priority, application Italy, Aug. 9, 1974, 26188/74
Int. Cl.² C08F *214/22*
U.S. Cl. 526—79 8 Claims

1. A process for preparing elastomeric vinylidene fluoride/-tetrafluorethylene/1-hydropentafluoroethylene terpolymers containing between about 68% and about 80% in moles of vinylidene fluoride, by polymerizing the three comonomers in solution, emulsion or suspension, or in the absence of solvents and or dispersants (mass or bulk), in the presence of radical initiators, at a temperature of from −30° C to +200° C and under a pressure from the autogenous pressure to 300 atms., said process being characterized in that the feeding of the monomeric mixture to the zone in which the terpolymerization is effected is interrupted intermittently, the monomeric mixture is left to polymerize in said zone until the pressure reaches a value comprised between 1/100 and 9/10 of the pre-fixed, normal polymerization pressure, vinylidene flouride is then fed into said zone until a pressure value comprised between 11/10 and 19/10 of the pre-fixed normal pressure is reached, the monomers mixture thus obtained is left to polymerize in said zone until the normal pressure is reached, and thereafter feeding of the monomers mixture is resumed, the ratio between the vinylidene fluoride fed to the reaction zone alone, as separate monomer, to the vinylidene fluoride fed in the mixture with tetrafluoroethylene and 1-hydropentafluoroethylene being comprised between 0.1 and 1.5.

6. Elastomeric terpolymers of tetrafluoroethylene/1-hydropentafluoropropene/vinylidene fluoride, containing from about 68% to about 80% in moles of chemically combined vinylidene fluoride, prepared by the process of claim 1 and characterized by a high frequency of polymeric sequences, essentially consisting of polymerized vinylidene fluoride, the ratio between the frequency of the polymerized vinylidene fluoride sequences determined experimentally by NMR analysis and the theoretical value of the same frequency calculated on the basis of the mean composition of the terpolymer, being greater than 1.

4,027,087
METHOD FOR PRODUCING ETHYLENE POLYMERS
Akihiro Satoh, Yokosukashi; Shiro Konotsune, Yokohamashi; Atsuyuki Kachi, Yokohamashi, and Hiroshi Shimizu, Yokohamashi, all of Japan, assignors to Chisso Corporation, Osaka, Japan
Filed Oct. 30, 1972, Ser. No. 301,908
Int. Cl.² C08F *4/02, 10/02*
U.S. Cl. 526—114 13 Claims

1. A method for producing ethylene polymers which comprises polymerizing ethylene alone, ethylene with an α-olefin or ethylene with styrene at −50° to about 150°C at atmospheric pressure to 100 kg/cm². in the presence of a catalyst obtained by (i) mixing a trivalent metal halide selected from the group consisting of $AlCl_3$, $AlBr_3$ and $FeCl_3$ with a carbonate of metals belonging to I, II & IV, VII and VIII groups of the periodic table and/or a hydrogen carbonate of metals belonging to I group of the periodic table, (ii) reacting the resulting mixture with a compound of transition metals belonging to IV_a and V_a groups of the periodic table in the presence of an aromatic compound having no active hydrogen, and (iii) combining the resulting solid product with an organoaluminum compound.

4,027,088
PROCESS OF PREPARING POLYOLEFINS
Kazuo Matsuura, Kawasaki; Masaomi Matsuzaki, Yokohama; Fumiaki Oshimi, Kawasaki; Nobuyuki Kuroda, Yokohama, and Mituji Miyoshi, Kanagawa, all of Japan, assignors to Nippon Oil Company Ltd., Japan
Filed July 11, 1975, Ser. No. 595,371
Claims priority, application Japan, July 19, 1974, 49-82119
Int. Cl.² C08F *4/02, 10/02*
U.S. Cl. 526—124 4 Claims

1. A process for the production of polyolefins by polymerizing or copolymerizing one or more olefins in the presence of a catalyst comprising a transition metal compound supported on a solid carrier selected from the group consisting of an oxide, a double oxide and a hydroxide of magnesium and/or calcium and an organo-metallic compound selected from the group consisting of an organo-aluminum compound and an organozinc compound, said transition metal compound being selected from the group consisting of tetravalent titanium compounds, trivalent titanium compounds, pentavalent vanadium compounds, tetravalent vanadium compounds and triva-

lent vanadium compounds, said solid carrier being treated by direct contact with gaseous sulfur dioxide (SO_2) at a temperature in the range of room temperature to 800° C under a gaseous atmosphere and consisting of a product containing from 0.1% to 20% by weight sulfur.

4,027,089

PROCESS FOR POLYMERIZING ETHYLENE

Itsuho Aishima, Fujisawashi; Hisaya Sakurai, Kurashikishi; Yukichi Takashi, Kurashikishi; Hideo Morita, Kurashikishi; Tadashi Ikegami, Kurashikishi, and Toshio Sato, Kurashikishi, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed May 21, 1975, Ser. No. 579,639

Claims priority, application Japan, May 25, 1974, 49-58378; June 13, 1974, 49-66515; Sept. 26, 1974, 49-110004

Int. Cl.² C08F *4/66, 10/02*

U.S. Cl. 526—127 **14 Claims**

1. A process for polymerizing ethylene or a mixture of ethylene and another olefin which comprises polymerizing ethylene or a mixture of ethylene and another olefin in the presence of a catalyst prepared by reacting

A. a. a hydrocarbon-soluble organoaluminum-magnesium complex (i) of the formula

$$Al\ \ Mg\ \ X_pY_qR_r{}^1R_s{}^2$$

wherein

R^1 and R^2 each independently is a hydrogen atom or a hydrocarbon radical having 1 to 10 carbon atoms,

X and Y each independently is OR^3 or $OSiR^4R^5R^6$,

R_3 is a hydrocarbon radical having 1 to 10 carbon atoms,

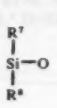
R^4, R^5 and R^6 each independently is a hydrogen atom or a hydrocarbon radical having 1 to 12 carbon atoms,

α and β each independently is a number more than zero and β/α is from 1 to 10,

$p + q + r + s = 3\alpha + 2\beta$, and

$0 < (p+q) / (\alpha+\beta) \leq 0.8$, or

b. a reaction product of the complex having the formula (i) wherein p and q are 0 with a linear or cyclic siloxane compound (II) having a constitutional unit



wherein

R^7 and R^8 each independently is a hydrogen atom or a hydrocarbon radical having 1 to 10 carbon atoms,

with (B) at least one titanium or vanadium compound (iii) having at least one halogen atom, and subsequently reacting the thus obtained hydrocarbon insoluble reaction product (C) with an organoaluminum compound (D) of the formula

$$AlR_m{}^9Z_{3-m}$$

wherein

R^9 is a hydrocarbon radical having 1 to 20 carbon atoms,

Z is selected from the group consisting of a hydrogen atom, halogen atom, alkoxy, aryloxy and siloxy groups, and

m is a number from 2 to 3.

4,027,090

MERCAPTAN-HYDROCARBON CHAIN MODIFIERS IN ACRYLONITRILE COPOLYMERS

Brandford E. Giddings, Warrensville Heights, and Janet M. Eggett, Oxford, both of Ohio, assignors to Standard Oil Company, Cleveland, Ohio

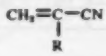
Filed Feb. 5, 1976, Ser. No. 655,439

Int. Cl.² C08F *220/44, 220/50*

U.S. Cl. 526—224 **4 Claims**

1. The process comprising polymerizing in an aqueous medium 100 parts by weight of monomers comprising

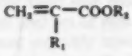
A. from 60 to 90% of weight of at least one nitrile having the structure



wherein R is hydrogen, a lower alkyl group having from 1 to 4 carbon atoms, or a halogen, and

B. from 10 to 40% by weight of at least one member selected from the group consisting of

1. an ester having the structure



wherein R_1 is hydrogen, an alkyl group having from 1 to 4 carbon atoms, or a halogen, and R_2 is an alkyl group having from 1 to 6 carbon atoms,

2. an alpha-olefin having the structure

wherein R' and R'' are alkyl groups having from 1 to 7 carbon atoms,

3. a vinyl ether selected from the group consisting of methyl vinyl ether, ethyl vinyl ether, the propyl vinyl ethers, and the butyl vinyl ethers,

4. vinyl acetate, and

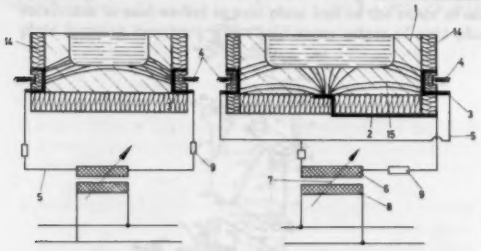
5. styrene,

in the presence of a mercaptan selected from the group consisting of primary, secondary, and tertiary alkyl mercaptans containing from 4 to 16 carbon atoms, the tetra-mercapto ester of pentaerythritol and beta-mercapto propionic acid, and limonene dimercaptan and a hydrocarbon selected from the group consisting of cyclohexane and ethyl benzene, and wherein there is employed from 0.01 to 10 parts per 100 parts by weight of monomer of combined mercaptan-hydrocarbon and the weight ratio of mercaptan to hydrocarbon is from 0.01 to 10, respectively.

4,027,091
METHOD AND APPARATUS FOR THE INDIRECT HEATING OF GLASS-CARRYING PASSAGES, FEEDERS AND FEEDER HEADS

Helmut Pieper, Lohr am Main, Germany, assignor to SORG GmbH & Co., Pflochsbach, Germany

Filed Jan. 20, 1975, Ser. No. 542,737
Int. Cl.² C03B 5/02
U.S. Cl. 13—6 **10 Claims**

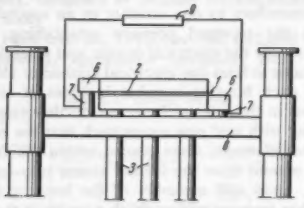


1. Apparatus for indirectly heating molten glass-carrying passages, feeders and feeder heads comprising a structural refractory material having a resistivity greater than the resistivity of molten lime-sodium glass, said refractory material forming said passages, feeders and feeder heads, and a plurality of electrode means in contact with and mounted exteriorly of said refractory material forming said passages, feeders and feeder heads and means to supply said electrode means with electrical energy via independent heating circuit means.

4,027,092
ELECTRODE HOLDER OF A MULTIELECTRODE FURNACE

Boris Izrailevich Medovar, ulitsa A.Barbjusa, 22/26, kv. 109; Ilya Iosifovich Kumysh, Vozdukhoflotsky proezd, 42, kv. 51; Georgy Alexandrovich Bolko, Vladimiro- Lybedskaya ulitsa, 16, kv. 106; Stanislav Vitalievich Grodzitsky, ulitsa Matejuka, 5, kv. 110, all of Kiev; Nikolai Vasilievich Arkhipov, ulitsa Melentievoi, 7, kv. 54, and Anatoly Nikolaevich Skoropupov, ulitsa Melentievoi, 7, kv. 53, both of Petrozavodsk, all of U.S.S.R.

Filed Feb. 17, 1976, Ser. No. 658,704
Int. Cl.² H05B 7/101
U.S. Cl. 13—15 **7 Claims**

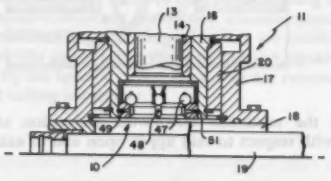


1. An electrode holder of a multielectrode furnace for holding consumable electrodes having an enlarged inventory head, comprising: a support plate with through holes, the number of holes corresponding to the number of consumable electrodes, said support plate being made from at least two parts insulated electrically from each other, each part of the support plate having at least two holes of a shape necessary for fastening said inventory heads of said consumable electrodes, the other holes being used for passing said consumable electrodes, said parts of the support plate being arranged above each other in such a way that said through holes, of one of said parts of the support plate, used for fastening said inventory heads of said consumable electrodes are located coaxially in front of said holes, of the other part of the support plate, through which said consumable electrodes pass, each part of said support plate being made of a conductive material, being connected to a corresponding lead of a power supply source and being used for feeding a current to the consumable electrodes arranged thereon.

4,027,093
INGOT GRIPPER ASSEMBLY

Frank M. Kibbish, Santa Rosa, Calif., assignor to Optical Coating Laboratory, Inc., Santa Rosa, Calif.

Filed Mar. 1, 1976, Ser. No. 662,738
Int. Cl.² H01J 37/30
U.S. Cl. 13—31 **8 Claims**



1. In an ingot gripper assembly for use in gripping an ingot of material which has a substantially cylindrical shape, a base having an upper inwardly and downwardly inclined surface and a cylindrical opening defined by a cylindrical surface extending through the inclined surface, first and second spaced apart pairs of spaced apart pins carried by said base and extending upwardly from said base and forming a set of pins, a ball disposed in said set of pins between said first and second pairs of pins and movable upwardly from an inclined surface and inwardly and outwardly between said first and second pairs of pins, said first and second pairs of pins facing each other with the first pair being spaced farther from said cylindrical surface than said second pair, the sides of said ball and the spacing between the pins of said second pair being such that when said ball is resting upon said upper inclined surface the innermost peripheral surface of the ball extends into a region defined by a cylindrical surface coincident with the first named cylindrical surface, the spacing between the first named pair of pins being such that when an ingot is disposed in said ingot gripper assembly, said ball engages the ingot and engages said first pair of pins whereby the ingot is free to move upwardly through the opening in the ingot gripper assembly but is restrained in downward movement in the ingot gripper assembly by said ball engaging said ingot and said first pair of pins to prevent substantial downward movement of said ingot.

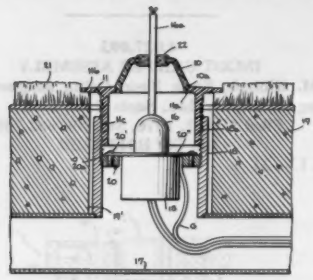
4,027,094
CONNECTOR HOUSING

Francis X. Philips, 50 E. 191 St., Bronx, N.Y. 10468

Filed Sept. 17, 1975, Ser. No. 614,340
Int. Cl.² H02G 3/28
U.S. Cl. 174—48 **11 Claims**

1. In combination, internally threaded cylindrical mounting means for attachment to flooring in an axially vertical disposition with an upper open end, an electrically conductive ring having external threads corresponding to that of said mounting means and a generally annular ledge, said ring being vertically adjustable threadedly in said mounting means so that the position of said annular ledge is at any selected position beneath said upper open end of said mounting means, an electric plug-receiving receptacle, connecting means for detachably securing and electrically grounding said electric plug-receiving receptacle through said ring and to said annular ledge such that said ring surrounds and electrically grounds said receptacle and exposes the latter to said upper open end of said mounting means, and cap means for closing said upper open end of said mounting means and having an aperture through which electrical wiring terminating in a plug is disposable to

be connected to said receptacle, said ring including projection means extending axially of said annular ledge for engaging and



limiting the maximum downward disposition of said cap means with respect to said upper open end of said mounting means.

4,027,095

HERMETICALLY SEALED ARC FURNACE

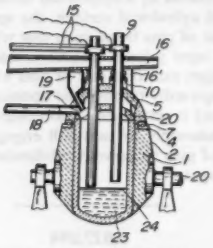
Hideaki Kishida, Tokyo; Hiroshi Fukuoka, Tokuyama, and Teruhiko Kameyama, Shinnanyo, all of Japan, assignors to Nisshin Steel Co., Ltd. and Matsuzaka Company, both of Tokyo, Japan

Filed Feb. 13, 1975, Ser. No. 549,477

Claims priority, application Japan, Feb. 21, 1974, 49-20701; Dec. 12, 1974, 49-142000; Dec. 12, 1974, 49-142001

Int. Cl.² H05B 7/00

U.S. Cl. 13—9 R 2 Claims



1. A hermetically sealed arc furnace comprising

A. a furnace body having a ratio of an inner diameter to an inside depth of 0.5 to 2.0;

B. a furnace lid provided with a gas exhaust opening;

C. a pressure reducing means detachably connected to said gas exhaust opening;

D. an electrode extending through said furnace lid into said furnace body;

E. a hermetically sealing means arranged between said furnace lid and said furnace body and composed of a pair of semicircular cross-section grooves into which a gasket material is inserted. said gasket bearing total weight of said furnace lid; and

F. a telescope-type sealing means arranged between said furnace lid and said electrode and composed of an outer water-cooled double-walled sleeve secured to said furnace lid, an inner water-cooled double-walled sleeve secured to said electrode, and an intermediate water-cooled double-walled slidably sandwiched through a Teflon packing between said outer and inner sleeves.

4,027,096

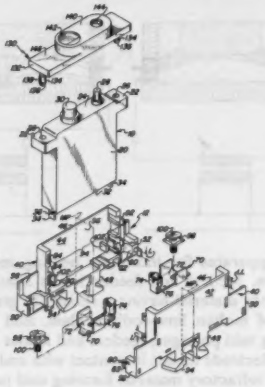
ELECTRICAL DEVICE HOUSING

William T. Waddington, Fanwood, and Harold F. Jenkins, Irvington, both of N.J., assignors to Amerace Corporation, New York, N.Y.

Filed Feb. 25, 1975, Ser. No. 552,742

Int. Cl.² H05K 5/00

U.S. Cl. 174—52 R 13 Claims



1. A housing for receiving an electrical device and connecting the device into an electrical circuit, said housing comprising:

a pair of identical housing members, each having an interior face including at least one recessed portion;

each housing member including at least one set of two complementary catch elements extending transverse to said face, the catch elements of a set each being located in opposite directions from a medial plane passing laterally through the member transverse to the interior face and spaced equidistant from the medial plane such that upon assembly of one of said housing members with the other, with the interior faces in face-to-face relationship and the medial planes of the housing members superimposed, corresponding complementary catch elements of the housing members will be engaged to secure the housing members to one another in an assembled housing, with the recessed portions establishing a receptacle therein for the electrical device, and wherein the housing includes at least one electrical connector element therein and each housing member includes at least a further recess in the interior face, said further recess communicating with said one recess such that the electrical connector element, when placed within the further recess, will extend from the further recess into said one recess and, upon said assembly of the housing members, the further recesses will establish a cavity in the housing and the electrical connector element will be captured within the housing and provide an electrical path between said receptacle and said cavity.

4,027,097

SPLIT COVER PLATE FOR TELEPHONE OUTLET

George W. Gillemot, Santa Monica, Calif., assignor to John T. Thompson, Santa Monica, Calif., a part interest

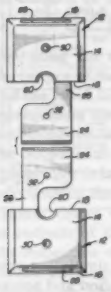
Filed June 15, 1976, Ser. No. 696,431

Int. Cl.² H02G 3/14

U.S. Cl. 174—66 3 Claims

1. A split cover plate for a telephone outlet, or the like, including two identical plate forming members having front and rear sides and respectively comprising plate halves provided with longitudinally spaced outer and inner edges, said inner edges of said plate halves being abuttable and being

provided therein with complementary notches for forming an opening for receiving a telephone cord, or the like, when said inner edges abut, said plate forming members respectively including adjacent the rear sides thereof tongues projecting longitudinally from said inner edges of said plate halves, said plate halves being provided adjacent their outer edges with tongue receiving sockets extending toward their inner edges, said tongue of each of said plate forming members being receivable in said socket in said plate half of the other of said plate forming members when said inner edges of said plate



halves abut, said plate half of each of said plate forming members being provided with a screw hole registrable with a screw hole in said tongue of the other of said plate forming members when said plate forming members are assembled with said inner edges of said plate halves abutting and with said tongues in said sockets, and detent means on said plate halves and said tongues of said plate forming members for releasably locking said plate forming members together when they are assembled with said inner edges of said plate halves abutting and with said tongues in said sockets.

4,027,098

METHOD FOR ESTABLISHING CONFERENCE CONNECTIONS IN DIAL-OPERATED TELECOMMUNICATION EXCHANGES

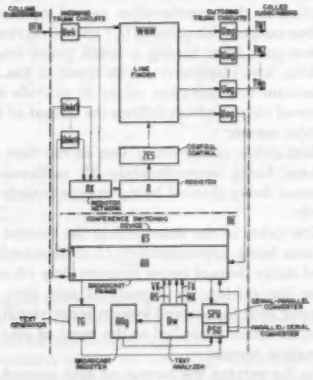
Hans Reisch, Munich, and Dieter Giersberg, Westerham, both of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Dec. 22, 1975, Ser. No. 642,698

Claims priority, application Germany, Dec. 20, 1974, 2460603

Int. Cl.² H04L 11/00

U.S. Cl. 178—3 **5 Claims**



1. A method for selectively establishing variably restrictive forms of multiaddress connections in dial-operated teleprinter exchanges, comprising:

emission of a first signal from a calling subscriber station including a specific symbol combination in accordance with a desired form of multiaddress connection and containing switching information corresponding to the form of multiaddress connection to be completed,

establishing, in accordance with the switching information contained in said first signal, a broadcast connection, a conference connection wherein all called subscribers receive all message signals, a semi-conference connection wherein message signals transmitted by the called subscribers are each received only by said calling subscriber, or a sub-conference connection wherein message signals transmitted by said calling subscriber are received only by a specific called subscriber and message signals transmitted by the specific called subscriber are received only by said calling subscriber.

4,027,099

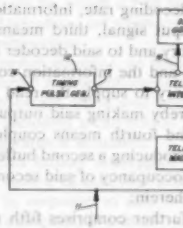
REDUCING TELEPRINTER ERRORS CAUSED BY PRIMARY POWER FREQUENCY VARIATIONS

Robert D. Streeter, Fort Wayne, and John G. Mohr, Woodburn, both of Ind., assignors to The Magnavox Company, Fort Wayne, Ind.

Filed Mar. 8, 1976, Ser. No. 664,598

Int. Cl.² G11B 5/44

U.S. Cl. 178—23 R **17 Claims**



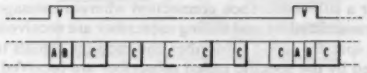
1. A system for modifying the rate at which data is supplied to a teleprinter machine operating at a speed as determined by the frequency of alternating current primary input power to the teleprinter machine, comprising: a signal squaring circuit to provide an output signal corresponding in frequency and phase to the alternating current primary input power; a phase comparator to compare the output signal from the signal squaring circuit with a second signal; a voltage controlled oscillator to provide an output frequency that is controllable by an output from the phase comparator; a loop divider to divide the output frequency from the voltage controlled oscillator and thereby generate the second signal for use by the phase comparator; an output divider to divide the output frequency from the voltage controlled oscillator down to a frequency suitable for clocking input data into the teleprinter machine, the output divider providing an output that varies as a function of the frequency of the alternating primary input power, and means responsive to said divider output for controlling the rate at which data is supplied to said teleprinter machine.

4,027,100

CODE TRANSMISSION SYSTEM HAVING BUFFERS OF APPROXIMATELY EQUAL CAPACITIES ON BOTH TRANSMITTING AND RECEIVING SIDES

Tatsuo Ishiguro, Tokyo, Japan, assignor to Nippon Electric Company, Ltd., Tokyo, Japan

Filed Feb. 13, 1976, Ser. No. 657,799
Claims priority, application Japan, Feb. 13, 1975, 50-18500
Int. Cl.² H04W 7/04
U.S. Cl. 178—69.1 5 Claims



1. In a code transmission system which comprises a transmitter and a receiver, said transmitter comprising synchronization means for producing synchronization codes of a predetermined code pattern regularly with respect to time, encoder means coupled to said synchronization means and responsive to information to be transmitted for successively producing information codes representative of said information between two adjacent synchronization codes, a first buffer memory for storing codes supplied thereto, first means coupled to said synchronization and said encoder means and to said first buffer memory for supplying the synchronization and the information codes from said synchronization and said encoder means to said first buffer memory, means coupled to said first buffer memory for reading the codes stored in said first buffer memory to transmit the read out codes at a predetermined transmission rate, and second means coupled to said first buffer memory for producing a first buffer occupancy code indicative of buffer occupancy of said first buffer memory, said receiver comprising a second buffer memory for storing the codes transmitted from said transmitter, decoder means for decoding, at a decoding rate, information codes supplied thereto into an output signal, third means coupled to said second buffer memory and to said decoder means for reading the synchronization and the information codes stored in said second buffer memory to supply the read out codes to said decoder means thereby making said output signal represent said information, and fourth means coupled to said second buffer memory for producing a second buffer occupancy code indicative of buffer occupancy of said second buffer memory, the improvement wherein:

said transmitter further comprises fifth means coupled to said first and said second means and to said first buffer memory for supplying the first buffer occupancy codes from said second means to said first buffer memory in a predetermined relation to the synchronization codes supplied from said synchronization means to said first buffer memory and

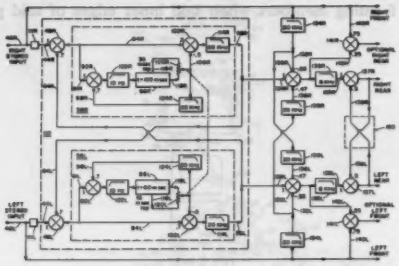
said receiver further comprises sixth means coupled to said third means for reading the first buffer occupancy codes stored in said second buffer memory, seventh means coupled to said sixth and said fourth means and responsive to the first buffer occupancy codes supplied from said sixth means and to the second buffer occupancy codes supplied from said fourth means for producing, when the buffer occupancy indicated by the supplied second buffer occupancy codes has a difference from a predetermined value, a control signal of an amplitude representative of said difference, and eighth means coupled to said seventh means and to said decoder means and responsive to the amplitude of said control signal for controlling said decoding rate.

4,027,101

SIMULATION OF REVERBERATION IN AUDIO SIGNALS

Richard E. De Freitas, Westford; Peter W. Mitchell, Charlestown; Peter D. Tribeman, Sharon, and Samuel Wilensky, Concord, all of Mass., assignors to Hybrid Systems Corporation, Bedford, Mass.

Filed Apr. 26, 1976, Ser. No. 680,473
Int. Cl.² H04R 5/00
U.S. Cl. 179—1 GQ 2 Claims



1. A system for simulating reverberation acoustics in an audio signal having first and second system input signals, said system comprising:

at least first and second reverberation means, each including:

a delay line having:

means for providing a first delay in the input signal;

means for providing a second delay in the input signal, which second delay is larger than the first delay; and

means for combining the delay line input signal delayed by the first delay with the delay line input signal delayed by the second delay in a variable proportion to provide a delay line output, so that the effective delay of the delay line output can be varied;

a first reverberation mixer having first and second inputs with gains of 1.0 and 0.7, respectively, and having the signal applied as input to the reverberation means applied to the reverberation mixer first input;

a high-pass filter having a break point frequency of approximately 10 Hz and responsive on its input to the output of the first reverberation mixer to provide a high-pass filtered output which is applied to the input of the delay line;

a low-pass filter having a breaking point frequency of 20 kHz and responsive on its input to the delay line output to provide a low-pass filtered output which is applied to the second input of the first reverberation mixer;

a second reverberation mixer combining the signal applied to the reverberation means input with the delay line output with gains of 0.7 and −0.5, respectively; and

a low-pass filter having a break point frequency of 20 kHz, and responsive on its input to the output of the second reverberation mixer to provide a low-pass filtered output which defines the output of the reverberation means;

the first delay of the delay line in the first reverberation means being approximately 35 milliseconds, and the second delay thereof being approximately 100 milliseconds;

the first delay of the delay line in the second reverberation means being approximately 15 milliseconds and the second delay thereof being aproximately 60 milliseconds;

means for mixing the output of said first reverberation means with the second system input signal to provide an output which is applied to the input of said second reverberation means;

means for mixing the output of said second reverberation means with the first system input signal to provide an output which is applied to the input of said first reverber-

ation means, thereby to provide recirculation of signals through said first and second reverberation means in a closed loop;

there being a less than unity gain for the loop gain of said closed loop;

first and second low-pass output filters, each having break point frequencies of approximately 20 kHz, and receiving on respective inputs the first and second system input signals to provide respective filtered outputs;

third and fourth low-pass output filters, each having break point frequencies of approximately 20 kHz and receiving on respective inputs the outputs of the second and first low-pass output filters to provide respective filtered outputs;

the first output mixer combining the outputs of the first low-pass output filter, the output of the first reverberation means, and the output of the third low-pass output filter to provide an output representing the combination;

a second output mixer combining the output of the second low-pass output filter, the output of the second reverberation means, the output of the fourth low-pass output filter to provide an output representing the combination;

fifth and sixth low-pass output filters receiving on inputs thereof respectively the outputs of the first and second output mixers to provide respective outputs;

first and second phasing means, each having an input and an output and providing respective outputs in which frequency componenets of the input signal applied thereto higher than a selected frequency are inverted in phase with respect to frequency components lower than the selected frequency; and

a third output mixer combining the output of the fifth output filter and the output of the first phasing means to provide an output applied to the second phasing means;

a fourth output mixer combining the output of the sixth output filter and the output of the second phasing means to provide an output applied to the first phasing means;

the outputs of the third and fourth output mixers providing first and second system output signals.

4,027,102

VOICE VERSUS PULSED TONE SIGNAL DISCRIMINATION CIRCUIT

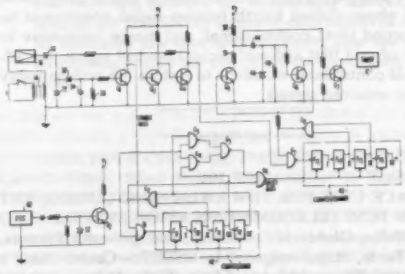
Shizuo Ando, and Terumasa Shimizu, both of Kawagoe, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Nov. 25, 1975, Ser. No. 635,015

Claims priority, application Japan, Nov. 29, 1974, 49-143371[U]; Oct. 13, 1975, 50-139295[U]

Int. Cl.² H04M *3/22*

U.S. Cl. 179—1 VC **8 Claims**



6. A voice signal discriminating circuit for discriminating a voice signal on a line from standard busy signals and dial tones on said line, said circuit comprising,

counter summation means for counting, when enabled, the number of cycles of any audio signal coupled thereto, said counter summation means comprising a plurality of counting stages, each having a reset/enablement terminal,

coupling means for connecting audio signals on said line to said counter summation means,

smoothing and rectifying circuit means connected to said coupling means for generating an actuating control signal when an audio signal is on said line, and

time period control means connected to said smoothing and rectifying circuit means and to said counter summation means for enabling said counter summation means for a predetermined period which begins a fixed period after initiation of said actuating control signal, said fixed period being long enough to prevent enablement of said counter summation means during the rise time of a busy signal and dial tone, and

output means connected to said counter summation means for producing an indication at the output thereof, signifying that a voice signal is on said line, when the count accumulated by said counter summation means reaches a predetermined number.

4,027,103

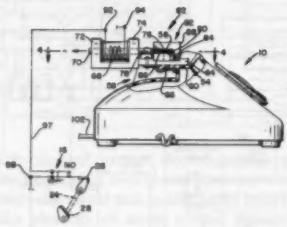
BURGLAR ALARM IMPROVEMENTS

George K. Roeder, Box 4335, Odessa, Tex. 79760

Continuation-in-part of Ser. No. 506,439, Sept. 16, 1974, Pat. No. 3,937,891. This application Dec. 8, 1975, Ser. No. 638,834

Int. Cl.² H04M *11/04*

U.S. Cl. 179—5 R **8 Claims**



1. An alarm system by which a first telephone set is connected to a second telephone set when the system is activated, comprising, in combination;

a motor driven switch actuator, an automatic dialing apparatus by which said first telephone set is connected to said second telephone set when said appartus is energized; switch means including a call button by which said automatic dial apparatus is actuated;

a telephone switch button interrupter by which the telephone switch button of said first telephone is depressed and released in response to said interrupter being de-energized and energized; circuit means including an interrupter switch for connecting said interrupter to a current source; a mount means by which said interrupter is mounted on said first telephone set; said interrupter includes a solenoid affixed to said mount means, an armature moved from a first to a second position when said solenoid is energized, a blade member affixed to said armature;

said blade member being movable into superimposed relationship respective to the telephone switch buttons when said solenoid is de-energized such that the telephone switch buttons are depressed, said blade member being movable out of engagement with said telephone switch buttons when said solenoid is enegized such that the telephone switch buttons are released;

said mount means includes a block having a slot formed therein, means by which said block is spaced respective to the telephone switch buttons such that said buttons freely reciprocate respective thereto, the slot of said block reciprocatingly receiving said blade therein, said slot being placed normal to the line of motion described when said buttons are reciprocated;

circuit means including an alarm switch means for connecting the motor of said motor driven switch actuator to a source of current;

means positoning said motor driven switch actuator to sequentially actuate said interrupter switch and said call button such that said telephone switch button interrupter releases said telephone switch button and thereafter actuates said call button;

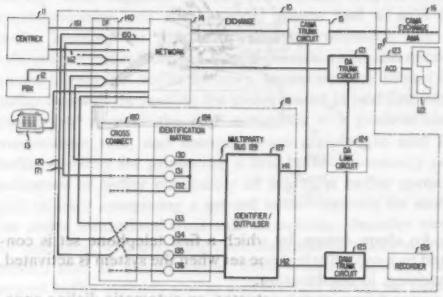
whereby, actuation of said alarm swtich means energizes said motor driven switch actuator, said motor driven switch actuator actuates said interrupter switch to cause the telephone switch button to be released so that a dial tone is received, and thereafter moves said call button whereupon the automatic dialing apparatus dials the second telephone thereby establishing communication between the first and second telephones.

4,027,104

ARRANGEMENT FOR AUTOMATICALLY GENERATING ALTERNATE TELEPHONE STATION IDENTIFICATION CODES

Arthur Paul Levitt, Hauppauge; Robert Vincent Oakley, New City, and Roy Earl Patterson, Bay Shore, all of N.Y., assignors to American Telephone and Telegraph Company, New York, N.Y.

Filed Apr. 28, 1976, Ser. No. 680,912
Int. Cl.[2] H04M *15/34*
U.S. Cl. 179—7 R **13 Claims**



9. A calling station identifier for use in a telephone exchange serving a plurality of stations in compiling billing information pertaining to toll calls originated from the stations, comprising

means for generating alternate station identification codes in response to a toll call from a prescribed one of the stations, and

means operated by the exchange in accordance with the class of the toll call for controlling the generating means to select a desired one of the alternate codes to which billing for the call is to be directed.

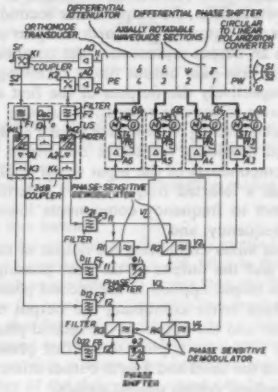
4,027,105

CONTROL SYSTEM TO RE-ESTABLISH THE ORTHOGONALITY OF TWO CROSS-COUPLED ORTHOGONALLY POLARIZED TRANSMITTED SIGNALS

Heinz Kannowade, Backnang, Germany, assignor to Licentia Patent-Verwaltungs G.m.b.H., Frankfurt, Germany

Filed Feb. 20, 1976, Ser. No. 659,855
Claims priority, application Germany, Feb. 20, 1975, 2507282
Int. Cl.[2] H04J *11/00*
U.S. Cl. 179—15 BC **10 Claims**

1. A control system for re-establishing the orthogonality of two transmitted orthogonally polarized signals which are cross-coupled when received in a relay link, one of said transmitted signal being provided with a beacon signal of a first frequency and the other of said transmitted signals being provided with a beacon signal of a second different frequency, said system comprising in combination: means for receiving said two transmitted signals; decoupling network means, having its input connected to the output of said receiving means and including at least first and second series connected controllable members for adjusting the orthogonality of said received signals, for providing a respective one of said two signals at each of its two outputs; means, connected to said outputs of said decoupling network means, for coupling out the beacon signal components from each of said output signals from said decoupling network means and for converting the coupled out beacon signal components into two pairs of beacon signal components with one of said pairs including a first beacon signal component representative of the beacon signal of said first frequency in a received one of said transmitted signals and a second beacon signal component representative of the beacon signal of said second frequency in said received



one of said transmitted signals, and with the other of said pairs including a third beacon signal component representative of the beacon signal of said first frequency in the received other of said transmitted signals and a fourth beacon signal component representative of the beacon signal of said second frequency in said received other of said transmitted signals; phase shifting means for shifting the phase of each of said first and fourth beacon signal components by 90°; a first phase sensitive demodulator means for multiplicatively comparing said phase shifted first beacon signal component with said third beacon signal component to form a first (V2) control signal; a second phase sensitive demodulator means for multiplicatively comparing said second beacon signal component with said phase shifted fourth beacon signal component to form a second (V4) control signal; and means responsive to the value of said first and said second control signals for adjusting said controllable members to restore the orthogonality of the two received signals.

4,027,106

INTERFACE UNIT FOR TDM SWITCHING COMPONENT OF PCM TELECOMMUNICATION SYSTEM

Piero Belforte; Giancarlo Guaschino, and Giovanni Perucca, all of Turin, Italy, assignors to CSELT - Centro Studi e Laboratori Telecomunicazioni SpA, Turin, Italy

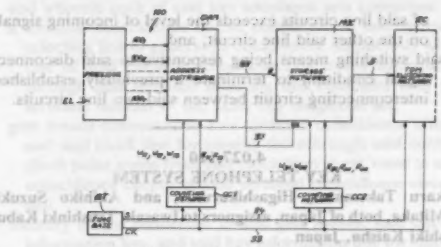
Filed Jan. 27, 1976, Ser. No. 652,870
Claims priority, application Italy, Jan. 28, 1975, 67187/75
Int. Cl.[2] H04J *3/16*
U.S. Cl. 179—15 AT **10 Claims**

1. In an exchange of a telecommunication system serving a multiplicity of subscriber lines, including a processor for allocating to any active subscriber line an incoming and an outgo-

ing PCM channel, a switching network for operatively coupling the incoming and outgoing channels of one subscriber line to the outgoing and incoming channels, respectively, of another subscriber line during corresponding time slots of a recurrent TDM frame, and an interface unit inserted between said processor and said switching network, the improvement wherein said interface unit comprises:

distributing means connected to said processor for receiving thereform, during each time slot, the addresses of all allocated incoming and outgoing channels forming up to *r* channel pairs, said distributing means having a first output for sequentially reading out the addresses of all allocated incoming channels and a second output for sequentially reading out the addresses of all allocated outgoing channels during each time slot;

a set of a *n* substantially identical transfer memories with *r*/*n* stages each for the storage of respective channel addresses read out during one time slot from one of said outputs, each stage being unequivocally identifiable by a channel address read out from the other of said outputs, *n* being an integer greater than 1;



writing means for entering, during each time slot, all the channel addresses read out from said one of said outputs in the stages identified by the channel addresses concurrently read out from the other of said outputs;

reading means for sequentially scanning the stages of each transfer memory during successive time slots, the stages scanned during any time slot occupying homothetic positions in said transfer memories, said reading means including *k* generating of mutually staggered enabling pulses each connected to a respective subset of *n*/*k* transfer memories for preselecting certain stages thereof, *k* being an integer greater than 1 divisible into *n*; and

multiplexing means synchronized with said reading means for establishing within each time slot a series of immediately consecutive scanning intervals during each of which all said transfer memories are successively connected to said switching network for transmitting thereto the contents of the preselected stages of each subset of *n*/*k* transfer memories in a time span beginning after the start and terminating before the end of the corresponding enabling pulse.

4,027,107

MULTIPLE CHANNEL FM STEREO SYSTEM

Carl G. Eilers, River Forest, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.

Continuation of Ser. No. 401,926, Sept. 28, 1973, which is a continuation-in-part of Ser. No. 283,464, Aug. 24, 1972, abandoned, which is a continuation-in-part of Ser. No. 190,008, Oct. 18, 1971, abandoned. This application Dec. 24, 1975, Ser. No. 643,962

Int. Cl.[2] H04H *5/00*

U.S. Cl. 179—15 BT 6 Claims

1. A multi-channel stereo receiver for developing a predetermined plurality of discrete audio signals from a multi-channel composite stereo signal frequency modulated RF carrier, which composite signal when initially created by a multiplexing system includes a four-element sum component representing the sum of four input audio signals,

a first two-element difference component representing a difference between elements of a related first pair of said audio input signals modulating a first subcarrier of angular frequency ω_s,

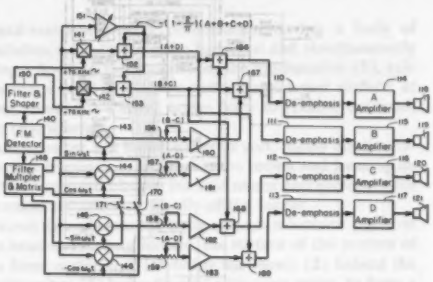
a second two-element difference component representing a difference between elements of a related second pair of said audio input signals modulating a second subcarrier of angular frequency ω_s but displaced in phase, relative to the phase of said first subcarrier, by 90°, and

a four-element difference component representing a difference between the sum of said first pair of audio input signals and the sum of said second pair of audio input signals modulating a third subcarrier of angular frequency ω_{ss}, said receiver comprising:

demodulating means for recovering said composite signal from said modulated RF carrier;

means for generating a like plurality of pulse trains;

a demultiplexing system, having a like plurality of output



terminals, coupled to said demodulating means and to said pulse generating means and responsive to said recovered composite signal and to said pulse trains for developing a like plurality of audio output signals individually issuing from an assigned one of said output terminals, each of said audio signals including, in addition to a desired audio signal, undesired audio quantities;

a like plurality of subtractors individually coupled to assigned ones of said demultiplexing system output terminals for individually translating a selected one of said desired audio output signals to an assigned audio signal utilization circuit; and

attenuator means coupled to the output of said demodulating means for selecting and applying a portion of said recovered composite signal to each of said subtractors to adjust the levels of each of said desired audio signals translated through said subtractors to compensate for any change in the level of said desired audio signals attributable to said multiplexing system,

as well as to substantially eliminate said undesired audio quantities from each of said desired audio signals.

4,027,108

MODULAR REGISTER AND SENDER ARRANGEMENT

Thomas J. Moorehead, and John A. Gauthier, both of Brockville, Canada, assignors to GTE Automatic Electric (Canada) Limited, Brockville, Canada

Continuation of Ser. No. 510,081, Sept. 27, 1974, Pat. No. 3,941,937. This application Feb. 26, 1976, Ser. No. 661,432

Int. Cl.[2] H04Q *3/54*

U.S. Cl. 179—18 EB 9 Claims

1. An improved register and sender arrangement for a communication switching system, said system comprising a central processor, data buses connected to said central processor, bus interface units connected to said data buses for transferring control signals and data between said central processor and said register and sender arrangement via said data buses, a

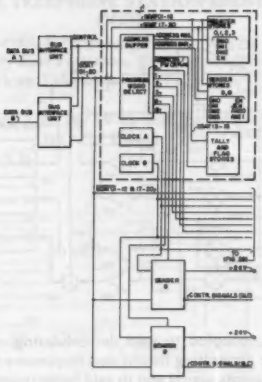
register line circuit and a sender line circuit, said register line circuit and said sender line circuit coupled to a switching network and to said register and sender arrangement, said improved register and sender arrangement comprising:

register means connected to said register line circuit for receiving data from said register line circuit;

sender means connected to said sender line circuit for transmitting data to said sender line circuit;

common control means connected to said bus interface units and respectively to said register means and said sender means for selectively transferring data from said central processor to said register means or sender means, or selectively transferring data from said register means or sender means to said central processor, said common control means including;

memory means for respectively storing data for said register means and said sender means, including,



register storage means for storing data related to said register means; and

sender storage means for storing data related to said sender means;

decoding means responsive to said control signals for respectively address controlling the transfer of data to and from said register means and said sender means, including,

address buffer means for selectively addressing said register storage means or said sender storage means; and

progress word control means responsive to said control signals for selectively transferring data, respectively to or from said register means, and to or from said sender means; and clock means for timing the transfer of said data; and

internal bus means connected to said common control mean, said register means, and said sender means for coupling said control signals and said data therebetween.

4,027,109

TELEPHONE CALL DIVERTING SYSTEM

Lloyd M. Smith, and Robert E. Webb, both of 2830 Clearview Place, Atlanta, Ga. 30340

Filed June 27, 1975, Ser. No. 591,026

Int. Cl.² H04M 3/54

U.S. Cl. 179—18 BE **9 Claims**

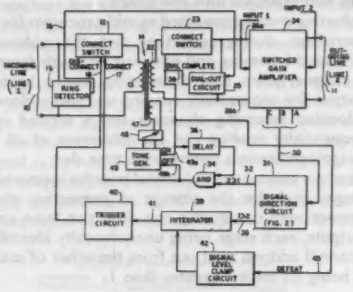
1. Apparatus for selectively disconnecting a circuit connection which bridges two lines, comprising:

a first line circuit operatively connected to one of said lines;

a second line circuit operatively connected to the other of said lines;

at least the first said line circuit including switching means selectively operative to establish an interconnecting circuit between said two line circuits;

means responsive to the levels of incoming signals on each of said two line circuits to provide a disconnect signal condition only when the level of incoming signals on one



of said line circuits exceeds the level of incoming signals on the other said line circuit; and

said switching means being responsive to said disconnect signal condition to terminate a previously established interconnecting circuit between said two line circuits.

4,027,110

KEY TELEPHONE SYSTEM

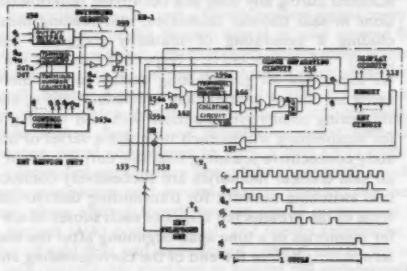
Hikaru Takematsu, Higashikurume, and Akihiko Suzuki, Mitaka, both of Japan, assignors to Iwasaki Tsushinki Kabushiki Kaisha, Japan

Filed Dec. 3, 1974, Ser. No. 529,050

Claims priority, application Japan, Dec. 5, 1973, 48-135276; Dec. 5, 1973, 48-135277; Dec. 14, 1973, 48-138755; Dec. 14, 1973, 48-138756; Dec. 14, 1973, 48-138757

Int. Cl.² H04M 1/72

U.S. Cl. 179—99 **5 Claims**



1. In a key telephone system including a key service unit to be connected in use to at least one CO line; a plurality of key telephone sets; control lines including a display information line, a key information line, a terminal selecting line and a clock line, and connecting said key service unit to said plurality of key telephone sets; wherein said key service unit comprises:

a control counter for generating control clock pulse trains to temporarily store key information applied from said key telephone sets and display information to be sent out to said key telephone sets, to control the use and non-use of said CO lines, and to successively scan said key telephone sets;

a terminal number counter connected to said control counter and said terminal selecting line for successively selecting said key telephone sets by sending out through

said terminal selecting line predetermined selection codes in a time division manner;

an input buffer register connected to said key information line for storing key information applied from said terminal telephone sets;

a key data memory connected to said input buffer register to temporarily store the instant state of said key information representative of the use and non-use of said key telephone sets;

CO line supervision-and-control means connected between the input and output of said key data memory for monitoring the state of use of said CO line and said key telephone sets by comparing the key information of an immediately preceding scanning period with the instant key information;

display information control means connected to the output of said CO line supervision-and-control means for sending out corresponding display information; and an output buffer memory connected to said display information control means and said display information line to temporarily store said display information and send out the same to said display information line;

and wherein each of said key telephone sets comprises:

a terminal coincidence circuit connected to said terminal selecting line to generate a coincidence output only when one of said predetermined selection codes transmitted through said terminal selecting line coincides with the terminal number of the same key telephone set;

gate means connected to said terminal coincidence circuit and said clock line for passing therethrough said control clock pulse trains from said clock lines in response to said coincidence output of said terminal coincidence circuit; and

memory means connected to said gate means, said display information line, and said key information line for storing said display information from said display information from said display information line in response to said clock pulse trains from said gate means and for storing key information and sending the same through said key information line in response to said coincidence output from said terminal coincidence circuit.

4,027,111

RIBBON LOUDSPEAKER

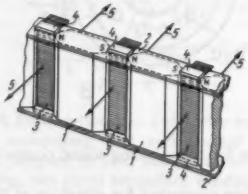
Alexei Fedoseevich Kasatkin, ulitsa Pravdy, 7/9, kv. 42, and Ilya Afanasievich Feldman, ulitsa Dubininskaya, 6, korpus 1, kv. 269, both of Moscow, U.S.S.R.

Filed Dec. 8, 1975, Ser. No. 638,371

Claims priority, application U.S.S.R., Dec. 17, 1974, 2083976

Int. Cl.² H04R *9/02, 9/06*

U.S. Cl. 179—115 V **4 Claims**



1. A ribbon loudspeaker comprising: a plurality of permanent magnets constituting a disconnected magnetic system, said permanent magnets being spaced and positioned successively one after another at a certain distance, a working gap formed between each adjacent pair of said permanent magnets; sound reproducing ribbons freely vibrating independently of each other, each of said sound reproducing ribbons being positioned within a working gap formed between the poles of a respective pair of adjacent permanent magnets.

4,027,112

HEAD-REST AND LOUDSPEAKER COMBINATION

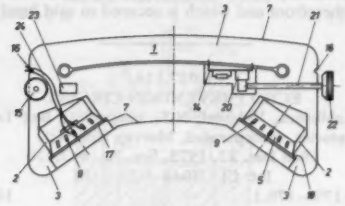
Paul Heppner, Hildesheim, and Gottfried Pohlmann, Wendhausen, both of Germany, assignors to Blaupunkt-Werke GmbH, Hildesheim, Germany

Filed Feb. 17, 1976, Ser. No. 658,342

Claims priority, application Germany, Mar. 20, 1975, 7508842

Int. Cl.² H04M *1/11*; H04R *1/28, 5/02*

U.S. Cl. 179—146 H **28 Claims**



1. head-rest-loudspeaker combination having a body of foam substance (3) forming the head-rest and simultaneously providing a housing and support for the loudspeaker (5), said body having a head-supporting surface and a rear surface, at least one recess (2) formed in the body to receive the loudspeaker (5), wherein

the loudspeaker is a loudspeaker of soft, highly elastic diaphragm suspension, secured in the recess and forming an airtight outward closure for said recess and providing for acoustic radiation outwardly of the recess;

the recess extends into the body of foam substance (3) from the head-supporting surface, the surface of the portion of the foam material (3) defining the recess (2) behind the loudspeaker (5) being formed with open pores, to form a soft suspension, closed, damped acoustical system;

the remaining surfaces of the body being essentially airtight.

4,027,113

HEADPHONE

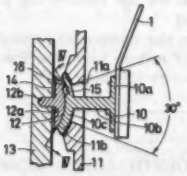
Toyosaku Matsumoto; Tokio Masui, and Takao Nakaya, all of Hamamatsu, Japan, assignors to Nippon Gakki Seizo Kabushiki Kaisha, Shizuoka, Japan

Filed Sept. 10, 1975, Ser. No. 612,027

Claims priority, application Japan, Sept. 12, 1974, 49-109159[U]; Nov. 1, 1974, 49-132668[U]; Nov. 5, 1974, 49-133089[U]

Int. Cl.² H04M *1/05*

U.S. Cl. 179—156 R **7 Claims**



1. A headphone comprising at least one ear cup, a head band, coupling means for coupling said ear cup to said head band, said ear cup having an ear pad on one side, said headband being positioned on that side of said ear cup away from the side where said ear pad is provided, said coupling means rotatably coupling said head band to that side of said ear cup located away from the side where the ear pad is provided, said coupling means enabling said ear cup to rotate vertically and horizontally relative to the ear of a user, said coupling means comprising a spherical surface headed member fixed at one

end to said head band and a spherical surface headed member-receiving portion provided on the ear cup,

said spherical surface headed member-receiving portion having a concave spherical seat and a convex spherical seat spaced from each other via a space formed in said receiving portion,

said spherical surface headed member having a spherical portion having spherical surfaces associated with said respective spherical seats and being slidably held between these respective spherical seats,

said spherical portion having a coupling rod portion extending therefrom and which is secured to said head band.

4,027,114

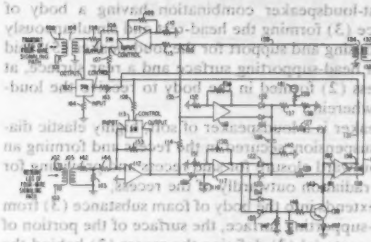
ECHO PREVENTION CIRCUIT

Heinz Kahlbrock, Holmdel, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 22, 1975, Ser. No. 643,120

Int. Cl.² H04B 3/22, 1/58

U.S. Cl. 179—170.2 **10 Claims**



6. A circuit for providing echo suppression on a two-wire signaling path and on a four-wire signaling path, the four-wire signaling path including a transmit leg and a receive leg, the circuit including,

a transmission path having a first portion extending from the two-wire signaling path to the transmit leg and having a second portion extending from the receive leg to the junction formed by the first portion of the transmission path and the transmit leg, whereby the first and second portions form a bidirectional highway for carrying signals from the receive leg and from the two-wire signaling path,

means included in the bidirectional highway for developing a voltage signal in response to the bidirectional passage of signals between the receive leg of the four-wire signaling path and the two-wire signaling path,

means responsive to the voltge signal developing means for comparing the signal level on the two-wire signaling path to the signal level on the receive leg of the four-wire signaling path, and

means responsive to the comparing means for preventing the propagation of echoes upon the four-wire signaling path and the two-wire signaling path.

4,027,115

ELECTROACOUSTIC SOUND GENERATOR

Erwin Martin, Munich, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Continuation of Ser. No. 359,894, May 14, 1973, abandoned, This application Mar. 22, 1976, Ser. No. 669,162

Claims priority, application Germany, May 15, 1972, 2223531

Int. Cl.² H04R 1/28

U.S. Cl. 179—179 **5 Claims**

1. An electroacoustic sound generator for use with apparatus having housing means of a size determined by the space required for said apparatus, said sound generator having a diaphragm formed by a piezoelectric layer vibrating in the audio frequency range, comprising:

first and second volume portions formed in a portion of said housing means in the interior thereof, said first portion being smaller in volume than said second portion which is of a volume determined by the interior dimensions of the entirety of said housing means.

said diaphragm being disposed between said first and second volume portions forming a boundary therebetween in said housing means and

means defining at least one outlet channel extending between said first volume portion and the exterior of said housing means through a wall of said housing means,

said channel and said first volume portion forming a Helmholtz resonator having a resonant frequency corresponding to the desired audio frequency to be radiated,

said resonant frequency being equal to the product of the compliance of said first volume portion and the square of the ratio of the cross-sectional area of said channel to the surface of said diaphragm.

4,027,116

HEADPHONE

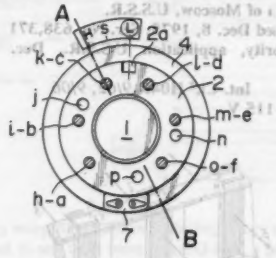
Komatsu Nakamura, 2-10, Nodera 2-chome, Niiza, Saitama, Japan

Filed Nov. 4, 1975, Ser. No. 628,841

Claims priority, application Japan, Nov. 13, 1974, 49-129995

Int. Cl.² H04R 1/28

U.S. Cl. 179—180 **4 Claims**



1. A headphone for reproducing sound comprising:

a frame;

a cone membrane supported for vibration at the outer periphery of one side of the frame;

the frame being provided with at least one opening to connect the space defined between the one side of the frame and the cone membrane with free space at the other side of the frame;

a mask member for varying the area of the opening in the frame to vary bass reproduction of sound produced by vibration of the cone membrane; and

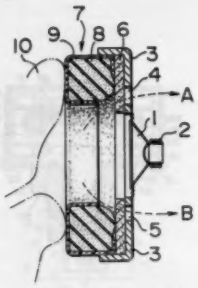
an acoustic resistance member disposed across the opening.

4,027,117

HEADPHONE

Komatsu Nakamura, 2-10, Nordera 2-chome, Niiza, Saitama, Japan

Filed Nov. 4, 1975, Ser. No. 628,843
Claims priority, application Japan, Nov. 13, 1974, 49-136634[U]
Int. Cl.² H04R 1/28
U.S. Cl. 179—180 5 Claims



1. A headphone for reproducing sound at the ear of a listener which comprises:

an oscillating member for sound reproduction;

an ear pad adapted to rest against the ear of the listener;

a frame supporting the oscillating member and the ear pad, the frame being provided with an opening constituting a path from the space defined by one side of the oscillating member, the ear pad and the ear of the listener to the free space on the other side of the oscillating member; and

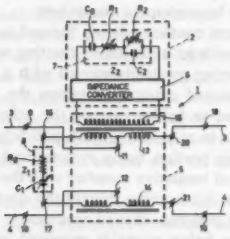
an acoustic resistance member disposed across the opening.

4,027,118

NETWORK HAVING A TRANSFORMER-COUPLED OPEN-CIRCUIT STABLE NEGATIVE IMPEDANCE AND A SHORT-CIRCUIT STABLE POSITIVE IMPEDANCE

Jan Karel August Poppe, Hilversum, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 21, 1975, Ser. No. 634,258
Claims priority, application Netherlands, Oct. 1, 1975, 7511542
Int. Cl.² H04B 3/16, 3/36
U.S. Cl. 179—170 G 3 Claims



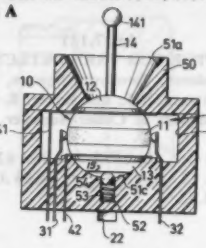
1. A network for insertion into a two wire transmission line, said network comprising first and second terminal pairs adapted to be coupled to said line, a transformer having a primary winding, two equal secondary windings, each secondary winding having a tap substantially at the center thereof, said taps being adapted to be coupled to said first terminal pair, one end of each of said secondary windings being coupled to said second terminal pair, an open circuit stable negative impedance means coupled to said primary for increasing the gain in a selected frequency band independent of the transmission direction; and means for making said network short circuit stable including a positive impedance means coupled between the remaining ends of said secondary windings and having an absolute real value of impedance lower than the absolute real value of said negative impedance means.

4,027,119

MULTI-DIRECTIONAL SWITCHING MECHANISM FOR CONTROLLING PLURAL LOAD CIRCUITS

Kiyoshi Tezuka, Shimizu, Japan, assignor to Murakami Kaimeido Co., Ltd., Japan

Filed Mar. 4, 1976, Ser. No. 663,592
Int. Cl.² H01H 9/00, 25/04
U.S. Cl. 200—6 A 13 Claims



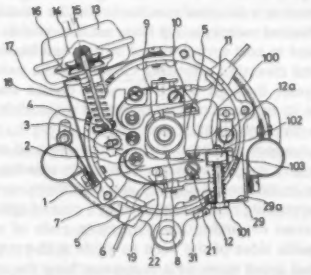
1. A multi-directional switching mechanism comprising, in combination, a housing having an internal cavity, a revolving ball accommodated in said cavity of said housing in such an arrangement as being able to turn in any selected direction about the center thereof and comprised of a pair of electro-conductive hemispheres and an electro-insulating intermediate portion sandwiched by said pair of hemispheres, an operating handle extending radially from the outer surface of said revolving ball out of said housing by way of which said ball is manually turned in multiple directions, a driving circuit having a pair of terminals disposed to said housing one of which is in a constant contact with one of said hemispheres of said ball and the other of which is in a constant contact with the other of said hemispheres and at least a load circuit having a pair of terminals disposed to said housing in such an arrangement that points of contact of said terminals with said ball are symmetric to each other with respect to said center of said ball.

4,027,120

IGNITION DISTRIBUTOR HAVING CONTACT ADJUSTMENT MECHANISM

Louis Chateâu, Rosny-sur-Bois, France, assignor to Ducellier & Cie., Paris Cedex, France

Filed Sept. 19, 1975, Ser. No. 614,887
Claims priority, application France, Sept. 24, 1974, 74.32126; Jan. 9, 1975, 75.00491
Int. Cl.² H01H 1/34, 19/62
U.S. Cl. 200—31 A 6 Claims



1. An ignition distributor with contact adjustment means comprising: a housing means, a fixed contact and a movable contact, a support for said fixed contact within said housing means a housing on said support, a nut mounted in said housing so as to be non-rotatable relative thereto, and an adjustment screw threadably engaged with said nut and fixedly retained and rotatably adjustable with respect to said housing

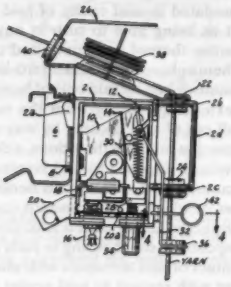
means, said nut and said housing being spaced from each other so as to permit angular movement of said housing about an axis transverse to the longitudinal axis of said adjustment screw when said screw is rotated.

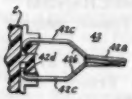
4,027,121

YARN TRAPPER FOR YARN DETECTOR SWITCH

Edward G. Haderer, Newtown Square, Pa.; Edward J. Sawoski, Blackwood, N.J., and Robert E. Shanebrook, Norwood, Pa., assignors to Cutler-Hammer, Inc., Milwaukee, Wis.

Filed Oct. 10, 1975, Ser. No. 621,548
Int. Cl.² B65H *25/14*; D04B *35/14*
U.S. Cl. 200—61.13 **7 Claims**





1. In a yarn detector device having a housing including yarn guiding means, a detector mechanism in the housing including a spring-biased switch, a trip lever on the outside of the housing coupled to said spring-biased switch and biased thereby in one pivotal direction affording closure of the switch and having an eyelet through which the yarn passes and when taut holds it in its opposite pivotal direction maintaining the switch open, the improvement comprising:

a yarn trapper mounted on said housing and comprising:

a helix and supporting means therefor causing one side its turns to be spread slightly apart to form yarn traps;

said supporting means comprising a pair of spaced supporting arms extending from opposite ends of said helix on opposite sides of the yarn to guide said yarn toward said spread apart turns as it is approaching the eyelet of said trip lever;

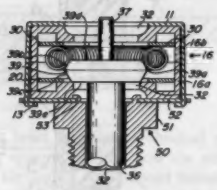
and snap-in means mounting the ends of said arms to said housing to confine said yarn between said housing and said arms and the corresponding side of said helix that provides said traps between the turns to catch the yarn upon partial swinging of said trip lever due to slackness in the yarn thereby to prevent unwanted tripping.

4,027,122

UNITIZED PUSH/PULL DOUBLE POLE SINGLE THROW SWITCH

Louis Albert Bevacqua, Des Plaines, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 31, 1974, Ser. No. 537,728
Int. Cl.² H01H *15/18*
U.S. Cl. 200—77 **2 Claims**



1. In an electrical switch having

first and second housing portions having a common longitudinal axis,

first and second pairs of electrically isolated contacts,

a resilient contactor means disposed within the housing portions and movable between first and second positions,

one pair of the contacts being mounted in each housing portion having one end of each contact terminating exteriorly of the housing portion and the other end of each contact disposed interiorly of the housing portion such that the first and second pairs of contacts are selectively bridged by the resilient contactor means when the latter is in the first or second positions respectively,

a cam shaped actuator slidably mounted in the housing portions and movable along the longitudinal axis for moving the resilient contactor between the first and second positions,

means for limiting axial movement of the actuator, and

means for securing the housing portions together to hold the switch components in assembled form

wherein the improvement comprises:

the resilient contactor being formed as a coiled tension spring with its ends joined floating within the housing while being positively moved with a snap-action over the cammed actuator between the first and second positions to bridge one or the other of the pairs of contacts in response to push-pull actuator movements,

each housing portion being symmetrical and formed as a cup-shaped insulative member with the open ends facing each other for housing therein the contacts, the resilient contactor and cam-shaped actuator,

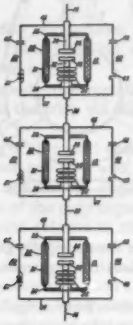
the actuator being rotatably mounted within the housing portions with the ends of the actuator extending beyond the first and second housing portions respectively, one end being accessible to and rotatable by an operator, the other end configured for coupling said rotational movements whereby the switch is adapted for performing multiple functions,

the actuator being movable axially between first and second positions, the cam portion of the actuator being formed with flat face portions at each axial end thereof and the housing portions being formed with interior wall portions, the limiting means including the flat face portions of the actuator respectively abutting the adjacent interior wall portion of the housing portion when the actuator is located in each of the first and second positions.

4,027,123
VACUUM CIRCUIT BREAKER COMPRISING SERIES CONNECTED VACUUM INTERRUPTERS AND CAPACITIVE VOLTAGE-DISTRIBUTION MEANS

Satoru Ihara, Wallingford, Pa., assignor to General Electric Company, Philadelphia, Pa.

Filed Mar. 11, 1975, Ser. No. 557,429
Int. Cl.² H01H *33/66*
U.S. Cl. 200—144 B 9 Claims



1. A multi-break alternating-current vacuum circuit breaker comprising:

a. a plurality of vacuum-type circuit interrupters,

b. means for connecting said interrupters electrically in series,

c. means for controlling the distribution of voltage appearing across said series combination of interrupters comprising a plurality of capacitive circuits respectively connected across said vacuum interrupters, the capacitive circuits having sufficient impedance as to exert no significant effect on the rate of rise of recovery voltage appearing across the circuit breaker after interruption,

d. the capacitive circuit across one of said interrupters comprising:

(d_1). the series combination of a relatively large main capacitor and a resistor connected across said one interrupter, and

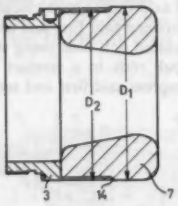
(d_2). a relatively small auxiliary capacitor external to said one interrupter and connected across said one interrupter in parallel with said series combination of main capacitor and resistor,

e. the circuit loop comprising said one vacuum interrupter and said auxiliary capacitor connected thereacross being underdamped so that discharge of said auxiliary capacitor through said one interrupter upon spark-over of said one interrupter results in an oscillatory current through said circuit loop that produces a natural current zero through said one interrupter and clearance by said one interrupter at said natural current zero well before said main capacitor has had time to fully discharge through said one sparked-over interrupter.

4,027,124
CONTACT SYSTEM FOR HIGH-VOLTAGE POWER CIRCUIT BREAKERS

Heiner Marin, and Alfred Müller, both of Berlin, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Aug. 1, 1974, Ser. No. 493,898
Claims priority, application Germany, Aug. 2, 1973, 2339553
Int. Cl.² H01H *33/12*
U.S. Cl. 200—146 R 4 Claims



1. In a contact system for a high-voltage power circuit breaker wherein a quenching medium is utilized to quench the arc drawn when the breaker is opened, the contact system including: at least one stationary, hollow, nozzle-shaped contact member, the contact member including an electrically conducting tube and a nozzle body of arc-resistant material supported by the tube at the end-face thereof, sid nozzle body and said conducting tube conjointly defining an outer contact surface; and, a tubular switching member having resiliently supported contact elements for engaging the stationary member when the breaker is closed, the tubular switching member being movable between a first position whereat the tubular member surrounds the stationary member and said contact elements engage said outer contact surface and a second position whereat said tubular switching member and said stationary contact member conjointly define a gap across which the arc is drawn when the tubular switching member is moved from the first position to the second position to open the breaker, the improvement in said contact system comprising: said nozzle body and said conducting tube conjointly defining a joint at the region of said stationary contact member surrounded by said tubular switching member when the latter is in said first position, said nozzle body having an outer diameter D_1 greater than the outer diameter D_2 of said conducting tube at said joint thereby causing the portion of said outer contact surface corresponding to the nozzle body to be raised with respect to the portion of said outer contact surface corresponding to the conducting tube whereby the resiliently supported contact elements of said tubular switching member apply a greater contact force to said nozzle body than to said conducting tube as said contact elements are drawn across said outer contact surface with the movement of said tubular switching member.

4,027,125
GAS INSULATED CIRCUIT BREAKER

Henry L. Peek, Brandon; Kanti V. Mehta, Jackson; John J. Abdou, and Amrut R. Patel, both of Brandon, all of Miss., assignors to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Mar. 17, 1975, Ser. No. 559,338
Int. Cl.² H01H *33/82*
U.S. Cl. 200—148 R 12 Claims

1. In a three-phase gas insulated circuit breaker having at least one interrupter per phase and each within a gas tight enclosure, said interrupters each having at least one movable contact;

an external pull rod box connected to each enclosure;

interrupter operating linkage within each of the pull rod boxes and operably connected to the movable contact of the interrupter within the enclosure;

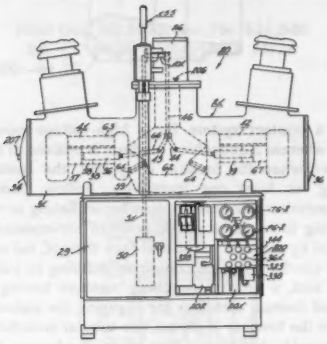
a pull rod operably disposed to extend within each external pull rod box and connected to the interrupter linkage therein to effect the opening and closing operation of the associated interrupter, all of said pull rods being connected together in series relationship so as to move as a unit;

a single operator connected to effect operation of said series connected pull rods;

a first spring means operatively connected to the pull rod associated with said second phase circuit breaker;

a second spring means operably connected to the pull rod associated with said third phase circuit breaker;

the connection between said first and second spring means with their associated pull rods being such that the movement of said pull rods in a contact closing movement operates to compress said first and second spring means; and,



means operably associated with each pull rod for effecting an adjustment thereof with relation to its associated interrupter contact wherein each pull rod moves a distance in a contact closing movement to effect the closing of its associated interrupter contact and the stored energy of said second spring means of said third phase is substantially totally utilized in the contact opening movement while the stored energy in said first spring means is only partially utilized;

whereby the initial movement of all of said pull rods in a contact closing movement is initiated by said first and second spring means but the entire energy stored in said first spring means is not expended so that excess velocity is not imparted to the pull rods to thereby avoid excessive shock loads to the system and said energy stored in said second spring means is substantially totally expended to effectively dampen contact bounce after the interrupter contacts have opened.

4,027,126

SHORTING AND GROUNDING ARRANGEMENT FOR GAS-INSULATED BUS BARS

Gerhard Grünert, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Dec. 11, 1974, Ser. No. 531,696

Claims priority, application Germany, Dec. 14, 1973, 2362297

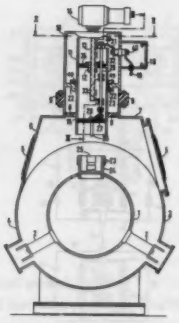
Int. Cl.² H01H *33/70*

U.S. Cl. 200—148 B **2 Claims**

1. A shorting and grounding device for an enclosed gas-insulated bus bar having an opening in the enclosure with a pot placed thereon containing a main contact which is movably supported therein, said main contact having an advance contact, with mating contacts at the bus bar for said advance contact and main contact, in which the improvement comprises:

a. a rigid terminal attached to the outside wall of the pot and insulated therefrom; and

b. a sliding contact arrangement movable with said main contact for establishing an electrically connection between said advance contact and said rigid terminal, said sliding contact and advance contact supported on the main contact in an insulated manner, said arrangement comprising:



1. first conductive means rigidly connected to said movable main contact through means insulating it therefrom;
2. second conductive means rigidly coupled to said pot through means insulating it therefrom; and
3. contact rollers between said first and second means for establishing an electrically conducting path therebetween.

4,027,127

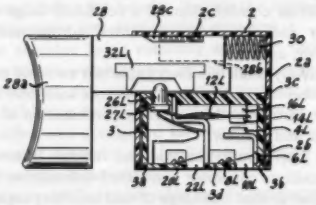
ELECTRIC SWITCHES HAVING SELECTABLE AND ADJUSTABLE PRE-TRAVELS

Merlin R. Dummer, Arab, Ala., assignor to Cutler-Hammer, Inc., Milwaukee, Wis.

Filed Nov. 21, 1975, Ser. No. 634,245

Int. Cl.² H10H *3/00*

U.S. Cl. 200—153 LA **20 Claims**

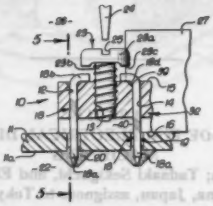


1. In an electric switch having a contact mechanism actuated by the camming action of a sliding operator, the improvement comprising a cam insert rigidly mounted in a recessed cavity in the operator and having camming surfaces for determining the actuating point of the contact mechanism relative to operator travel.

4,027,128
SCREW CONTACT SWITCH

Richard B. Walker, Lomita, Calif., assignor to The Anaconda Company, New York, N.Y.

Filed Nov. 17, 1975, Ser. No. 632,581
Int. Cl.² H01B 3/40
U.S. Cl. 200—158 9 Claims

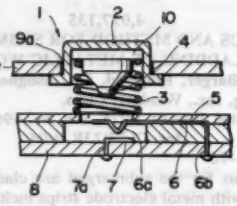


2. In a switch assembly connectible to a circuit board
a. an insulative strip containing first, second and third openings spaced apart in a row,
b. two electrically conductive metallic prongs respectively extending through the strip via the first and third openings, and
c. a fastener having a threaded shank extending into the strip via the second opening and having an electrically conductive head adapted to engage or disengage both prongs at one side of the strip depending on the extent of rotation of the shank relative to the strip
d. the prongs having certain ends extending toward the fastener shank to be engaged by the fastener head, said certain ends being turned to form L-shaped prong configurations, the strip being locally relieved to receive prong bends formed by turning of said ends.

4,027,129
PUSH BUTTON SWITCH

Zenkei Sato, Hachioji, Japan, assignor to Giko Kabushiki Kaisha, Tokyo, Japan

Filed Sept. 30, 1974, Ser. No. 510,730
Int. Cl.² H01H 3/14
U.S. Cl. 200—159 A 1 Claim

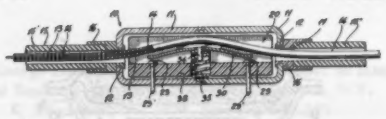


1. A push button switch comprising a push button, said push button being of an inverted cup-shaped configuration, a press member housed within and operated by said push button, a cover plate having an aperture telescopically receiving said push button, a substrate beneath and spaced from said plate, a stationary contact member carried by said substrate, a cantilevered flexible contact member carried by said substrate and being disposed above said stationary contact member, said push button, press member and flexible contact member being in alignment whereby upon the depression of said push button said press member contacts and deflects said flexible contact member into contact with said stationary contact member, said flexible contact member having an end including means for providing straight line contact with said stationary contact member, spring means disposed between said push button and said substrate for normally biasing said push button in a direction away from said substrate, said inverted cup-shaped push button being defined by an end wall and a peripheral skirt, said spring means being in external telescopic relationship to said press member, a cushion member seated between said end wall and said press member, said substrate including a cover plate, and said spring means being disposed between said last-mentioned cover plate and said end wall.

4,027,130
CABLE ACTIVATED SWITCH

Stanislaw F. Filip, Don Mills, Canada, assignor to I.C.S. Ignition Control Systems Ltd., Montreal, Canada

Filed July 17, 1975, Ser. No. 596,847
Int. Cl.² H01H 17/08
U.S. Cl. 200—161 4 Claims

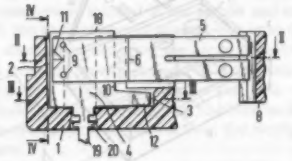


1. A cable activated switch comprising a hollow housing having opposed open ends to permit passage of a cable therethrough, a cable guide member having spaced apart side walls and an interconnecting wall between said side walls, said side walls defining a slot therebetween to permit restricted planar displacement of said cable therebetween above said interconnecting wall, a pair of electrical contacts secured in said interconnecting wall and insulated from one another, a contact bridge member resiliently biased in a direction away from said contacts and in alignment therewith, said contact bridge member being in support contact with a portion of said cable extending through said housing, said bridge member being resiliently biased against said portion of said cable whereby said cable is displaced in a curved path in said slot, said contact bridge being displaced against said biased direction by tensioning said cable between said opposed open ends of said housing whereby said curved cable portion will straighten and displace said contact bridge to contact said pair of electrical contacts to form an electrical flow path therebetween.

4,027,131
SPRING CONTACT ASSEMBLY

Martin Aidn, Degerndorf, near 87, and Franz Rappl, Feldkirchen-Westerham, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Sept. 5, 1975, Ser. No. 610,758
Claims priority, application Germany, Sept. 13, 1974, 2443966
Int. Cl.² H01H 1/26
U.S. Cl. 200—246 12 Claims



1. A contact spring assembly comprising an insulating body with a guide slot therein, a movable resilient elongated contact spring having a contact at a free end spring biased towards a counter contact member, the end opposite the free end affixed to a substantially rigid spring carrier, the spring carrier received in the guide slot in the insulating body, the spring carrier attached to the contact spring on a side of the contact

spring opposite the contact, the spring carrier having an edge spaced from the point of attachment of the spring to the spring carrier in the direction of the free end of the spring to allow a portion of said spring to be bent within said slot, with a portion of the contact spring including the free end projecting beyond the edge, the spring, intermediate the ends, contactable with the edge, and the edge forming a fulcrum for the spring at substantially right angles to the longitudinal extent of the spring.

4,027,132

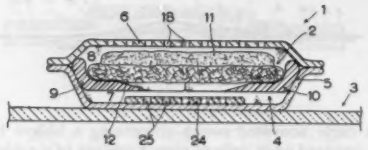
MICROWAVE PIE BAKING

Melvin L. Levinson, 1 Meinzer St., Avenel, N.J. 07001

Filed Apr. 17, 1975, Ser. No. 569,018

Int. Cl.² H05B *9/06*

U.S. Cl. 219—10.55 F **10 Claims**



1. Apparatus for baking a pizza pie by exposing said pie to microwave radiation which comprises:

a microwave-reflective, vapor-permeable cover to block the entrance of said microwave radiation from entering through the top of the topping of said pie,

a first tray, for supporting at least the peripheral portion of said pie's crust, said second tray being of a microwave-permeable material and having at least one opening beneath the central portion of said pie's crust, and

means supporting said second tray with respect to said first tray, with said second tray spaced from the bottom of said first tray to form a microwave-permeable steam-confining chamber therebetween when said pizza pie is in place and properly oriented.

4,027,133

MICROWAVE RADIATORS

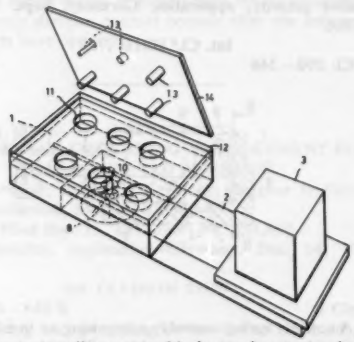
Hans G E Dygve, and Per Olov G Risman, both of Huskvarna, Sweden, assignors to Husqvarna AB, Huskvarna, Sweden

Filed Dec. 5, 1975, Ser. No. 638,023

Claims priority, application Sweden, Dec. 18, 1974, 7415886

Int. Cl.² H05B *9/06*

U.S. Cl. 219—10.55 F **5 Claims**



1. A microwave radiator assembly for use in an oven, having a heating chamber defined at the top and bottom thereof by a roof and a floor, one of which comprises a plate in which are provided radiation openings for the introduction of microwave radiation into the heating chamber from an antenna cavity adjacent thereto and forming part of said assembly, said antenna cavity containing an antenna system coupled to a microwave source via a waveguide or transmission line, said plate comprising a metallic plate in which a plurality of radiation openings are arranged, each embracing a respective coupling pin carried by a plate of microwave-transparent material, and mounted thereon to project coaxially into the respective radiation openings to be coupled with said antenna system.

4,027,134

ELECTRODE FOR ELECTRICAL DISCHARGE MACHINING

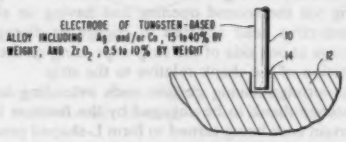
Osamu Arakawa; Tadaaki Sekiguchi, and Eiichi Takayanagi, all of Yokohama, Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Japan

Continuation of Ser. No. 521,505, Nov. 6, 1974, abandoned. This application Sept. 10, 1976, Ser. No. 721,956

Claims priority, application Japan, Nov. 12, 1973, 48-126214

Int. Cl.² B23P *1/08*

U.S. Cl. 219—69 E **3 Claims**



1. An electrical discharge machining electrode formed of a tungsten-based alloy consisting essentially of 15 to 40% by weight of one member selected from silver, copper or mixtures thereof, 0.5 to 10% by weight of zirconium oxide and the balance of tungsten.

4,027,135

APPARATUS AND METHOD FOR SUBMERGED ARC STRIP CLADDING OF METALLIC WORK PIECES

John Joseph Barger, Ringgold, Ga., assignor to Combustion Engineering, Inc., Windsor, Conn.

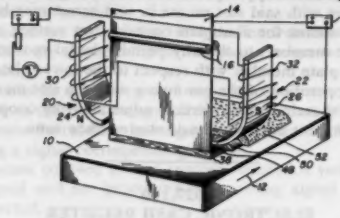
Filed July 17, 1975, Ser. No. 596,878

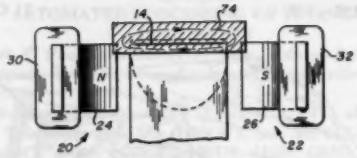
Int. Cl.² B23K *9/04*

U.S. Cl. 219—76 **6 Claims**

1. Apparatus for the submerged arc cladding of metallic work pieces with metal electrode strips melting in an electric arc while forming welding beads on the work piece, comprising a work piece, an electrode strip, means operative to move said electrode strip and work piece relative to each other, means for passing an electric current through said electrode and for creating an electric arc between said work piece and said electrode strip to melt said strip and to deposit a cladding layer on said work piece in a generally linear cladding zone, whereby flux lines are formed due to the electric current, means for depositing a welding flux covering in the region of the electric arc and at least the portion of the weld bead wherein the deposited cladding material is in a molten state, said flux covering being sufficient to provide a layer of molten flux overlying said region of molten metal and said layered molten flux having a layer of unmelted welding flux thereover, the flat side of said electrode strip facing said region of molten flux and molten metal layers being defined as the trailing side of said electrode strip, and electro-magnetic means having poles of opposite polarity positioned adjacent opposite edges of said electrode strip and on the trailing side thereof adjacent said region of molten flux and molten metal, the polarity and

location of said poles being such that the flux lines passing therebetween will tend to counteract on the trailing side the





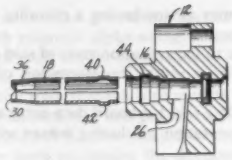
flux lines which surround the electrode strip due to the welding current on the trailing side.

4,027,136

SHEET METAL COLLET

Robert Gordon Taylor, Sterling Heights, Mich., assignor to USM Corporation, Boston, Mass.

Filed Nov. 4, 1975, Ser. No. 628,647
Int. Cl.² B23K 9/20
U.S. Cl. 219—98 **10 Claims**



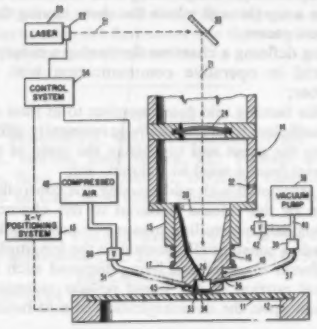
1. In combination with an automatic welding gun for end welding buttons to a panel, having wall structure defining a chamber into which a button is fed, and having a circular opening formed therein, a button retaining collet comprising a substantially circular tubular member formed of a unitary sheet of metallic material having an inner end extending through said opening in said wall structure, said tubular member further having a plurality of slots formed therein, each of said slots extending from the outer end toward said inner end and one of said slots extending the entire length of said member, said tubular member being formed with a larger diameter portion at its inner end than the diameter of said outer end, a plurality of detent elements spaced about the outer surface of said tubular member on said larger diameter portion and located adjacent said member inner end, said detent elements have portions extending beyond the limits of said circular opening formed in said chamber with said tubular member in the relaxed condition and said detent element portions extending within the limits of said circular opening with said tubular member compressed in the radial direction to close said one slotted opening, and means formed in said wall structure adjacent said circular opening for receiving said detent elements, whereby said inner end of said tubular member is insertable through said circular opening in said wall structure when radially compressed until said detent elements are aligned with said means for receiving said detent elements, and on release of radial compression said detent elements are received in said detent receiving means to inhibit removal of said tubular member from said circular opening.

4,027,137

LASER DRILLING NOZZLE

Hans George Liedtke, Binghamton, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Sept. 17, 1975, Ser. No. 614,049
Int. Cl.² B23K 9/00
U.S. Cl. 219—121 L **6 Claims**



1. Apparatus for drilling holes in workpieces by means of radiant energy and comprising:

a nozzle having a passageway extending through the interior thereof for enabling passage of radiant energy through the nozzle and onto a workpiece;

a metal aperture plate having an aperture therein for defining the size of the hole to be formed in the workpiece by the radiant energy;

a recess formed in the workpieces end of the nozzle and surrounding the radiant energy passageway for slideably receiving the aperture plate and aligning the aperture with the radiant energy axis of the nozzle, the depth of the recess being less than the thickness of the aperture plate;

an exhaust passageway located in the nozzle and communicating with the radiant energy passageway near the workpiece end thereof for enabling the air to be continuously evacuated from the workpiece end of the nozzle interior, such evacuation process serving as the sole retentive force for holding the aperture plate in place in the recess and to remove the drilling debris from the workpiece via the aperture;

and a positioning mechanism coacting with the nozzle for urging the exposed outer surface of the aperture plate against the workpiece;

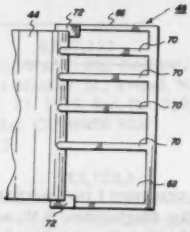
whereby the aperture plate in addition to defining the size of the hole to be formed in the workpiece also serves to protect the workpiece material immediately surrounding the hole;

and whereby discontinuation of the evacuation process enables quick removal of the aperture plate for cleaning or replacement purposes.

4,027,138
FUSER RELEASE MATERIAL DISPENSER

Ari Bar-on, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Mar. 25, 1976, Ser. No. 670,315
Int. Cl.² G03G 15/20
U.S. Cl. 219—216 8 Claims

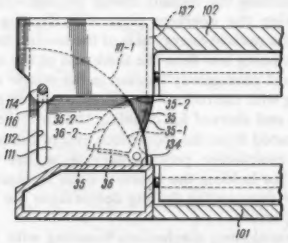


1. An apparatus for affixing substantially permanently heat settable particles to a sheet, including:
an elongated fuser member;
a back-up member cooperating with said fuser member to define a nip through which the sheet having the particles thereon passes;
a housing defining a chamber for storing a supply of release material in operative communication with said fuser member;
means for heating said fuser member to at least a temperature sufficient to substantially permanently affix the particles to the sheet and to change the state of the release material from a solid to a liquid; and
means, associated with said housing, for controlling solidification of the release material in the chamber of said housing said controlling means comprising a baffle plate extending substantially normal to the longitudinal axis of said furser member and being disposed such that a substantial portion of the liquid release material solidifies thereon upon the de-energization of said heating means.

4,027,139
DEVICE FOR GRILLING AND BROILING FOOD

Hubert Theimer, Nurtingen, Germany, assignor to Stumpp & Schule KG, Beuren, Germany

Filed Feb. 27, 1976, Ser. No. 662,229
Claims priority, application Germany, Feb. 28, 1975, 2508729
Int. Cl.² H05B 3/06
U.S. Cl. 219—525 4 Claims

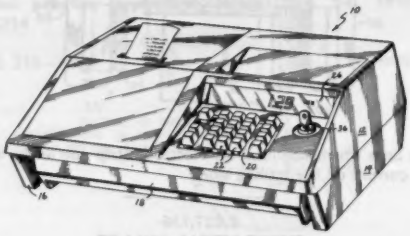


1. A device for grilling and broiling food comprising upper and lower plate members, a heatable plate with grilling surfaces attached to each of said plate members and heating means for heating each of said heatable plates, said upper plate member being capable of vertical and pivotal adjustment relative to the lower plate member, said lower plate member further including at least one upright turret member having upwardly extending elongated slot means and at least one stop surface zone, said upper plate member having pin means for cooperating with said slot means in said turret member, and abutment means for abutment on said stop surface zone of said turret member, to thereby permit pivotal movement of the upper plate member with respect to the lower plate member by cooperation of the pin means with the slot means and further to thereby permit vertical adjustment by cooperation of the abutment means and said stop surface zone.

4,027,140
ELECTRONIC CASH REGISTER

Hugh Fowler, Townsend; Murray A. Ruben, Belmont; Richard L. Dumais, Marlborough, and Robert F. Collings, Stowe, all of Mass., assignors to Data Terminal Systems, Inc., Maynard, Mass.

Filed Apr. 15, 1975, Ser. No. 568,285
Int. Cl.² G07G 1/00
U.S. Cl. 235—7 R 11 Claims

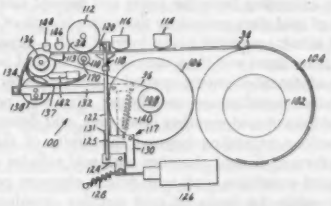


1. A cash register comprising:
1. a housing having an inverted U-shape with at least two, spaced, downwardly extending side members;
2. a cash till positioned between the side members and movably mounted with respect to the housing said cash till formed at least a portion of the bottom of the cash register;
3. keyboard data entry means having a plurality of actuatable data entry keys;
4. means responsive to the actuation state of said data entry keys for producing a visual representation of the data entered thereby; and,
5. means for mounting said keyboard data entry means and said visual representation producing means with respect to said housing.

4,027,141
APPARATUS FOR ENCODING A MAGNETIC LABEL

Richard F. Dubbe, St. Paul, Minn., and Richard D. Ebbinga, Camarillo, Calif., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Sept. 8, 1975, Ser. No. 611,236
Int. Cl.² G06K 7/08; G11B 5/09; B41L 47/46
U.S. Cl. 235—61.7 R 17 Claims



1. An apparatus for encoding a magnetic recording medium in the form of labels removably adhered to a carrier web and

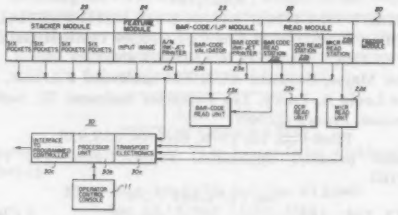
which upon removal therefrom are to be affixed as labels to articles for subsequent identification thereof, wherein the apparatus comprises

a. means for transporting said carrier web such that said labels are sequentially moved past a magnetic recording head,
b. means for energizing said recording head as a given label passes thereby to magnetically encode that label,
c. means for reading the magnetic encoding and for producing a signal corresponding thereto,
d. means coupled to said reading means for verifying said signal and for producing an enabling signal indicative thereof,
e. means for removing said carrier web from said encoded labels, and
f. means for automatically differently processing said encoded labels in response to the enabling signal.

4,027,142
AUTOMATED PROCESSING OF FINANCIAL DOCUMENTS

Robert E. Paup, and James F. Blair, both of Dallas, Tex., assignors to Recognition Equipment Incorporated, Dallas, Tex.

Continuation of Ser. No. 448,458, March 6, 1974, abandoned. This application Aug. 18, 1975, Ser. No. 605,605
Int. Cl.² G06K *3/02, 7/14;* **B41L** *45/00;* **G01D** *15/18*
U.S. Cl. 235—61.9 R **20 Claims**



1. An automated processing system for bank checks encoded with magnetic alpha-numeric characters along a line on the face of each check, comprising;

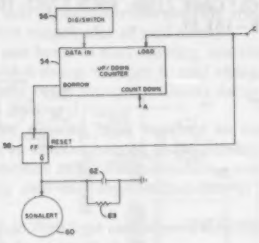
a. means for transporting said check serially as a constant velocity train through a processor to a sorter,
b. at a first station in said processor means for generating an item control number unique to each said document and to the bank processing the document,
c. at a second station in said processor means for sensing each character in said line to produce a string of data signals from each document,
d. at a third station in said processor means for printing said control number on each said document in at least one of bar code form and human readable form, and
e. means at a station intermediate said second and third stations scans the site at which each said document is to receive said bar code for the presence of bar codes and printing means at said third station is inhibited in response to detection of a bar code at said site.

4,027,143
ENCODING ALTIMETER

Norman M. Witriol, 2501 Lancelot Drive SE., Huntsville, Ala. 35803, and Carlton L. Frederick, 518 Dryden Road, Ithaca, N.Y. 14850

Division of Ser. No. 533,576, Dec. 17, 1974, Pat. No. 3,961,272. This application Mar. 8, 1976, Ser. No. 664,591
Int. Cl.² G06M *3/02;* **H03K** *21/36*
U.S. Cl. 235—92 PE **3 Claims**

1. A system comprising a counter having a count down input, a data in input, and a borrow output; first information means connected to the data in input so as to store a first count in the counter; a second information means producing a second count in the form of pulses which said counter can count; said second information means being connected to the count down input so as to cause the counter to count down; said counter producing an output at the borrow output when it is counted down to zero; control circuit connected to the

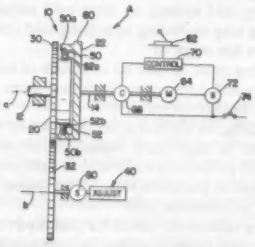


output of said borrow output so as to enable an indicator means when means to obtain a new counter counts down to zero; said second count on said second information means changes periodically; said counter having a load input; and reset signal means connected to the load input so as to cause said counter to reset the first count into the counter whenever a new second count is obtained.

4,027,144
MAGNETIC RETURN MECHANISM

Richard A. DeLille, East Moline, Ill.; William A. Curnan, Eldridge, Iowa, and Gentiel M. DeGryse, East Moline, Ill., assignors to Gulf & Western Industries, Inc., New York, N.Y.

Division of Ser. No. 546,512, Feb. 3, 1975, Pat. No. 4,005,819. This application Oct. 28, 1975, Ser. No. 625,833
Int. Cl.² G06C *15/42*
U.S. Cl. 235—144 ME **33 Claims**

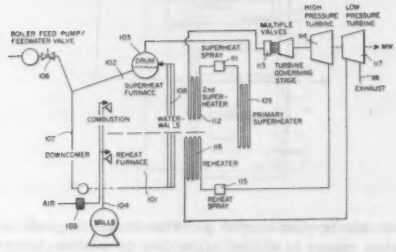


1. In a device for rotating a member about a given axis to a selected angular position when said member is free to rotate from a position angularly spaced from said selected position, said device including a first set of permanent magnets, means for supporting said first set of magnets on said member, a second set of permanent magnets, means for supporting said second set of magnets in a generally fixed position to create a magnetic return force on said first set of magnets and a magnetic reaction force on said second set of magnets, said forces combining to return magnetically said member to said selected position when said member is spaced from said selected position and is free to rotate, the improvement comprising: shifting means for allowing a preselected amount of movement of at least one of said magnets in said first and second sets of magnets in response to one of said magnetic forces, said allowed movement being generally arcuate of said given axis and with respect to the supporting means of the magnet allowed to move.

4,027,145
ADVANCED CONTROL SYSTEM FOR POWER GENERATION

John Patrick McDonald, Holland, and Harry G. Kwatny, Philadelphia, both of Pa., assignors to John P. McDonald, Holland, Pa.

Filed Aug. 15, 1973, Ser. No. 388,544
Int. Cl.² G06F 15/06; F01D 17/02; H02P 9/04
U.S. Cl. 235—151.21 17 Claims



1. In a system having a first plurality of physical parameters designated y, measurable by sensing means, and a second plurality of input control parameters designated u, alterable in said system by control means, said system being identified with a predetermined mathematical model of the form $dx/dt = Ax + Bu$, $y = Cx + Du$ for translating said control parameters into a third plurality of state variables designated x which dynamically characterize the behavior of said system, and for translating said state variables and control parameters into the measurable physical parameters, said model being exercised in and by sequentially operating computer means, a method for controlling said system to meet specified output requirements comprising the steps of:

a. measuring, at said sensing means, the present values of said physical parameters;

b. developing a set of estimates of said state variables;

c. translating said estimates of said state variables into corresponding estimates of said physical parameters; and

d. controlling said system to meet said requirements, said controlling step including operating said computer means to perform the steps of

1. predicting error of said set of values of said estimates of said physical parameters resulting from inaccuracy in said mathematical model;

2. developing, in response to said set of values of said estimates of said state variables, to predicted error from said predicting step, and to said present values of said physical parameters, a set of values for said input control parameters, and

3. coupling said set of values for said input control parameters to said control means in said system.

4,027,146
HIGH SPEED ACCURATE LOW FREQUENCY COUNTER

Charles Minot Gilmore, Bridgman, Mich., assignor to Heath Company, Benton Harbor, Mich.

Filed Mar. 23, 1976, Ser. No. 669,559
Int. Cl.² G01R 23/00
U.S. Cl. 235—151.31 13 Claims

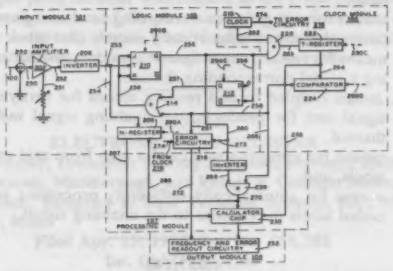
1. Apparatus for determining the frequency of an input signal by measuring an integral number of cycles of said input signals over a flexible measurement interval comprising:

a. input means, including first generating means, for receiving said input signal and for generating a series of trigger pulses wherein each trigger pulse is representative of the start of a cycle of said input signal;

b. clock means for providing an elapsed time signal representative of the duration of said flexible interval;

c. logic means, connected to said input means, for providing a cycle count signal representative of the number of integral cycles of said input signal occurring during said flexible interval, wherein said cycle count signal is a function of the number of trigger pulses in said series; and

d. processing means, including second generating means,

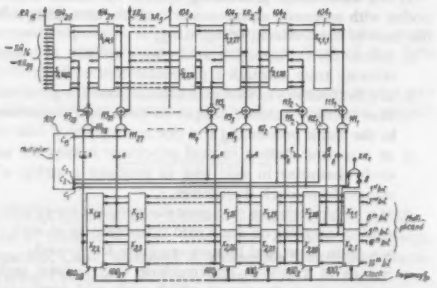


connected to said clock means and to said logic means, for computing the frequency of said input signal as a function of said cycle count signal and said elapsed time signal and for generating a frequency measurement signal indicative of the computed frequency.

4,027,147
BINARY MULTIPLICATION UNIT WITH PARTIAL PRODUCT AND SUM CALCULATION TIME HIGHER THAN MULTIPLICAND BIT INTERVAL

Jacques Majos, Batiment AC2, 223 boulevard d'Armor, and Jean-Louis A. Lardy, Les Fontaines Batiment 22, both of Lannion, France (22300)

Filed Feb. 18, 1976, Ser. No. 659,038
Claims priority, application France, Feb. 19, 1975, 75.05161
Int. Cl.² G06F 7/54
U.S. Cl. 235—164 2 Claims



1. A binary multiplication unit having a multiplication time substantially higher than the time separating the entering of two successive multiplicand words into the unit, said binary multiplication unit comprising:

a. a multiplicand storage means for successively storing multiplicand words and a multiplier storage means for permanently storing a predetermined multiplier word;

b. means for partitioning each multiplicand word into a plurality of multiplicand subwords following one another in increasing binary weight, each multiplicand subword comprising at least one binary element;

c. means for deriving from each multiplicand subword and the following multiplicand subword a shifted multiplicand subword obtained by omitting the bit of lowest binary weight of the multiplicand subword and adding thereto,

as bit of highest binary weight, the bit of lowest binary weight of the following multiplicand subword;

d. means for multiplying said shifted multiplicand subsords by the first bit of said multiplier word and thus obtaining first subproducts;

e. means for respectively multiplying said multiplicand subwords by the successive bits of the multiplier word starting from the second bit of said multiplier word and thus obtaining second, third and following subproducts associated with said multiplicant subwords;

f. means for adding together said first and said second subproducts and thus obtaining subproducts sums following one another in increasing binary weight;

g. means for deriving from each subproduct sum and the following subproduct sum a shifted subproduct sum obtained by omitting the bit of lowest binary weight of the subproduct sum and adding thereto, as bit of highest binary weight, the bit of lowest binary weight of the following subproduct sum;

h. means for respectively adding said third and following subproducts associated with each multiplicand subword respectively to third and following shifted subproduct subproduct sums deriving from the subproduct sum associated with the preceeding subproducts of the multiplicand subword and the subproduct sum associated with the preceeding subproduct of the following multiplicand subword; and

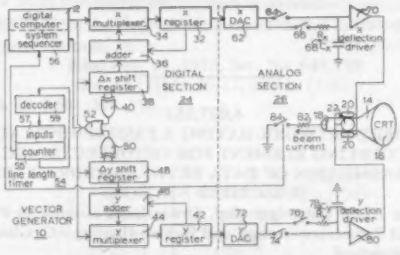
i. means for deriving said third and following shifted subproduct sums, each subproduct sum being obtained by omitting the bit of lowest binary weight of the subproduct sum associated to a given miltiplicand subword and adding thereto, as bit of highest binary weight, the bit of lowest binary weight of the subproduct sum associated with the following multiplicand subword.

4,027,148

VECTOR GENERATOR

Lawrence David Rosenthal, 7146 Saroni Drive, Oakland, Calif. 94611

Filed Sept. 10, 1975, Ser. No. 612,045
Int. Cl.² G06F *15/34, 3/14*
U.S. Cl. 235—198 **8 Claims**



1. Method for drawing line segments having normalized visual intensity on a cathode ray tube display screen from digital information including for each segment the steps of:

a. receiving a first set of digital values of planar coordinates of a starting point of a line segment to be drawn from a source of digital information;

b. converting said digital starting point values into deflection voltages directly related to the magnitudes of said values;

c. charging a pair of matched passive networks having the same predetermined time constant which remains unchanged regardless of line segment length of the respective levels of said deflection voltages;

d. positioning a drawing beam of said display at said starting point by said deflection voltages stored in said networks;

e. normalizing a second set of digital values defining said line segment relative to the starting point thereof by repeatedly multiplying said second set of digital values by the same factor until the layer of the two final products resulting therefrom equals or exceeds a predetermined normalization constant;

f. digitally adding each of said two final products to the corresponding one of said starting point coordinate values respectively to produce digital sums;

g. converting said digital sums into drawing voltages directly related to the magnitudes of said sums;

h. turning on said beam to start drawing, and simultaneously applying said drawing voltages to said charged networks to deflect said beam along the display locus of said segment to be drawn;

i. reducing the drawing time required to complete said segment by an amount related to the number of multiplication repetitions utilized in normalizing said digital values defining said line segment relative to the starting point;

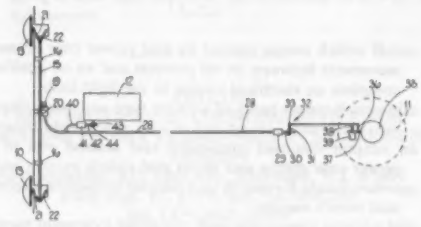
j. turning off said drawing beam when a terminal end of said segment has been reached.

4,027,149

MOTOR VEHICLE WITH TILTABLE HEADLAMPS

Frederick Raymond Patrick Martin, Bromley, England, assignor to The Lucas Electrical Company Limited, Birmingham, England

Filed Jan. 31, 1975, Ser. No. 545,883
Claims priority, application United Kingdom, Feb. 6, 1974, 5457/74
Int. Cl.³ B60Q *1/10*
U.S. Cl. 240—7.1 LJ **6 Claims**



1. A motor vehicle including a vehicle body, a pair of headlamps mounted on said vehicle body for pivotal movement about a horizontal axis, said headlamps being spaced apart transversely of the longitudinal axis of said vehicle body, and means for effecting pivotal movement of said headlamps, said means including an elongate element extending between said headlamps, said elongate elements being slidable transversely relative to said longitudinal axis of said vehicle body and along its own longitudinal axis, said means further including a linkage attached to each end of said elongate element and to an adjacent one of said pair of headlamps, said linkages being arranged so that longitudinal movement of said element causes simultaneous pivotal movement of said headlamps.

4,027,150

SAFETY LIGHT

David W. Dean, Southbury, Conn., assignor to NBC Entertainment Corporation, Burbank, Calif.

Filed Nov. 15, 1974, Ser. No. 524,038
Int. Cl. B62j *5/00*
U.S. Cl. 240—7.55 **21 Claims**

1. A safety lamp for a vehicle comprising:

power case means adapted to contain a source of power and adapted to actuate a light bulb when the bulb is disposed proximate a first end of said power case means;

light cover means attachable to said first end of said power

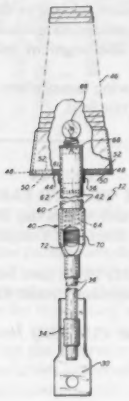
case means to enclose a light bulb disposed proximate thereto;

said light cover means constructed of a material permitting light from the light bulb when illuminated to pass therethrough;

a second end of said power case means extending outwardly and away from said light cover means;

an elongated extension means being at least as long as said power case means and connectable to the second end thereof;

a mounting bracket means connected to said elongated extension means adapted to secure said safety lamp to a vehicle;



on/off switch means carried by said power case means for movement between an off position and an on position to complete an electrical circuit to the light bulb;

said switch means being of a rotary type and being disposed proximate said second end of said power case means;

an adapter disposed proximate said second end of said power case means and about said switch means; and

aperture means formed in said adapter to facilitate access to said switch means;

said adapter connecting said elongated extension means to said power case means.

4,027,151

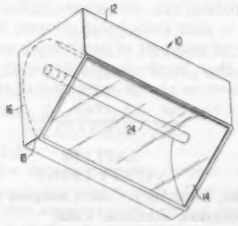
LUMINAIRE AND REFLECTOR THEREFOR

Frank S. Barthel, North Syracuse, N.Y., assignor to Crouse-Hinds Company, Syracuse, N.Y.

Filed Nov. 18, 1975, Ser. No. 633,135

Int. Cl.² F21V *7/00, 7/09*

U.S. Cl. 240—41.35 R **4 Claims**



1. A light reflector having an elongated reflecting surface of uniform concave cross-section including a first curved portion of circular cross-section the center of which is adapted to be disposed substantially coincident with the axis of an elongated light source, said first curved portion extending from 117° to 180° from nadir, a second curved portion which is a smooth continuation of said first curved portion extending from 180° to 270° from nadir for redirecting light in the zone from nadir to 65° and a third curved portion which is a smooth continuation of said curved portion extending from 270° to 355° from nadir for redirecting light in the zone from 50° to 65° from nadir; said second and third curved portions being defined by fourth degree polynominal equations and being adapted to reflect light directly received from said light source as well as light reflected from said first curved portion back through said light source to provide substantially uniform illumination of a plane surface disposed perpendicular to a line coincident with the radius of said first curved portion at the point of merger between said first and second curved portions.

4,027,152

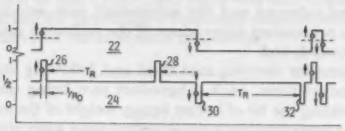
APPARATUS AND METHOD FOR TRANSMITTING BINARY-CODED INFORMATION

William W. Brown, Sunnyvale; Delon C. Hanson, and Thomas Hornak, both of Los Altos, all of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Nov. 28, 1975, Ser. No. 636,004

Int. Cl.² H04B *9/00*

U.S. Cl. 250—199 **14 Claims**



1. A method of transmitting binary-coded information comprising the steps of:

receiving a binary-coded signal having a first and a second state;

generating a pulse-coded signal in response to the binary-coded signal, the pulse-coded signal comprising: a data pulse of a first polarity when the binary-coded signal changes from the first to the second state, a data pulse of a second polarity when the binary-coded signal changes from the second to the first state, and a refresh pulse having the same polarity as the preceding data pulse when there is no subsequent data pulse for a predetermined time interval.

4,027,153

FIBRE NETWORK HAVING A PASSIVE OPTICAL COUPLING ELEMENT FOR OPTOELECTRONIC TRANSMISSION OF DATA BETWEEN ADDRESSABLE SUBSCRIBER STATIONS

Alfred Käch, Untersiggenthal, Switzerland, assignor to Patelhold Patentverwertungs- und Elektro-Holding AG, Glaurus, Switzerland

Filed Nov. 18, 1974, Ser. No. 524,710

Claims priority, application Switzerland, Nov. 28, 1973, 16683/73

Int. Cl.² H04B *9/00*

U.S. Cl. 250—199 **16 Claims**

1. A fibre network for optoelectronic transmission of data, comprising:

a plurality of subscriber stations;

each station including an optical information transmitter, an optical information receiver and coding facility means for recognizing a specific one of a plurality of address codes;

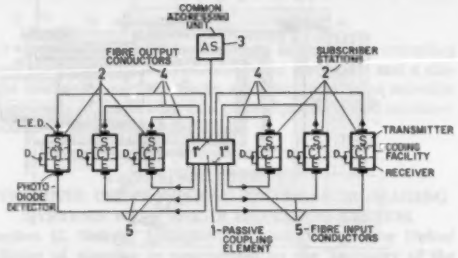
common addressing means for addressing said subscriber stations by periodically transmitting the address codes of said stations whereby the transmitter of the addressed subscriber station transmits information to the remaining said stations;

a passive optical coupling element, said coupling element comprising a solid light-conducting core having a pair of

opposing first and second end faces, said first and second end faces being devoid of an anti-reflective coating;

each transmitter of each of said stations and of said common addressing means optically connected to a first end of a different one of a first group of individual light-conducting fibres, a remaining end of each of said first group of fibres being optically connected to said first end face of said coupling element;

each receiver of each of said stations optically connected to a first end of a different one of a second group of individual light-conducting fibres, a remaining end of each of said second group of fibres being optically connected to said second end face of said coupling element;



said addressing means being optically coupled to a first end of an individual light conducting fibre, the remaining end of said light conducting fibre being optically coupled to said first end of said coupling element;

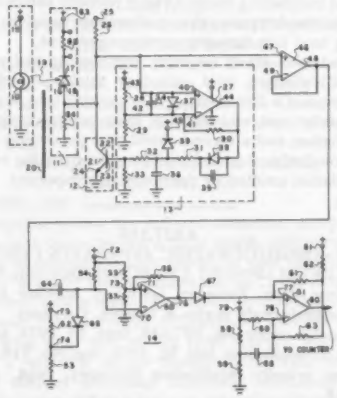
said coupling element having a length between said first and second end faces selected to cause an active surface area of all of said fibres coupled to said second end face to be fully illuminated by optical energy emanating from said remaining end of any one of the fibres coupled to said first end of said coupling element, whereby transfer of optical information between any pair of stations is accomplished without transferring the information through said common addressing means.

4,027,154

ELECTRONIC DOCUMENT DETECTOR CIRCUITRY WITH FEEDBACK CONTROL

John R. Flint, Barrington, Ill., assignor to Bell & Howell Company, Chicago, Ill.

Filed Dec. 29, 1975, Ser. No. 644,798
Int. Cl.² H01J *39/12;* **G06K** *15/00*
U.S. Cl. 250—214 AG **10 Claims**



1. An electronic document detector comprising:

a light source;

a current source including a light sensitive element spaced from said light source and arranged for receiving at least a portion of the light output of said light source for providing a current having a magnitude directly relative to the amount of light received by said element, the space between said light source and said element defining a path in which documents to be detected traverse, whereby as each document traverses said path said element is shielded from said light source;

a current sink coupled to said current source having an input and an output for providing at said output an intermediate control voltage having a magnitude related to the magnitude of the current provided by said current source and within a first range below a given level in the presence of a document within said path and within a second range above said given level in the absence of a document from said path;

a voltage detector coupled to said output of said current sink for providing a document indicative signal when said intermediate control voltage falls below said given level into said first range; and

intermediate control voltage restoring means coupled between said current sink output and said current sink input for restoring said intermediate control voltage to a predetermined level within said second range after each document traverses said path; whereby,

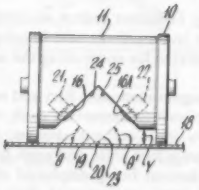
with said intermediate control voltage restoring means restoring said intermediate control voltage to said predetermined level within said second range after each document traverses said path, said current sink is reset for operation between documents to a level which assures proper intermediate control voltage transitions between said second range and said first range not withstanding variations in light output levels of said light source due to aging of said light source or the collection of dirt on said light source.

4,027,155

ELECTRO-OPTICAL COUNTING DEVICE FOR COUNTING PRODUCTS ARRANGED IN SHINGLE-LIKE FASHION

Edgar Rappaport, 855 Edel Ave., Maywood, N.J. 07607

Filed Aug. 13, 1975, Ser. No. 604,266
Int. Cl.² G01D *21/04*
U.S. Cl. 250—222 PC **5 Claims**



1. A counting apparatus for counting articles which comprises:

a. a housing

b. attached to said housing a combination of a light emitting source and a light receiving device in which

1. said light receiving device is adapted to detect light along a certain detection pathway, and

2. said light emitting source is adapted to direct a beam of light along a light pathway and wherein

3. said detection pathway and said light pathway cooperate to form a vertex at a predetermined point which coincides with the surface of an article to be counted when said counting apparatus is in use; and are so adapted relative to each other that light from the light emitting source incident upon said surface is detected

by said light receiving device but is not detected when said surface is not substantially located at said vertex, and

c. means attached to said light receiving device for differentiating between the detected light and the absence of detected light and means for converting the differentiation into a recordable event,

wherein said housing is a cylindrical body having two ends, a wheel rotatably mounted on each end, the circumference of each of said wheels defining a riding surface adapted to contact the surface of an article to be counted when said apparatus is in use, said riding surfaces lying in a plane which includes said vertex.

4,027,156

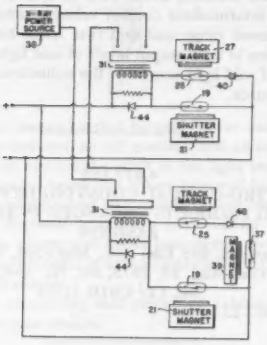
X-RAY SOURCE SAFETY SHUTTER

McLouis Robinet, Oak Park, Ill., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed May 25, 1976, Ser. No. 689,890

Int. Cl.² G21F 5/04; H01J 35/16

U.S. Cl. 250—275 **5 Claims**



1. In a high energy radiation source enclosed in a housing and having a shutter mounted on said housing, and a beam receptacle, a safety device for controlling the activation of the source, comprising:

first and second magnet elements, first and second mangetically responsive switch elements, each switch element being responsive to a magnet element being adjacent thereto to assume a first state and each being responsive to a magnetic element being displaced therefrom to assume a second state, one of said first elements being mounted on said housing and the other of said first elements being mounted on said shutter such that with the shutter closed said first switch element assumes said first state and with the shutter open said first switch element assumes said second state, one of said second elements being mounted on the receptacle and the other of said second elements being positioned such that with the receptacle in a desired location for safe activation of the source with the shutter open said second switch element assumes said first state and with the receptacle displaced from said desired location said second switch element assumes said second state, and relay means coupled to the source and having coupled in parallel thereacross said first and second switch elements, said relay means being responsive to either of said switch elements being in said first state to allow activation of the source.

4,027,157

DEVICE FOR MEASURING WEAR BY RADIOACTIVE RADIATION

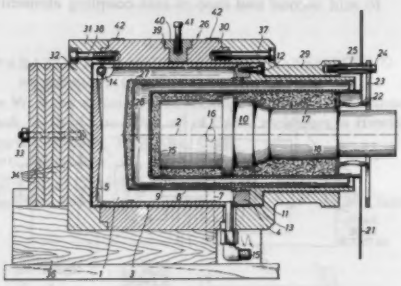
Andreas Gervé, Linkenheim; Hartmut Haury, and Wolfram Lausch, both of Karlsruhe, all of Germany, assignors to Gesellschaft fur Kernforschung m.b.H., Karlsruhe, Germany

Filed Feb. 10, 1976, Ser. No. 656,953

Claims priority, application Germany, Feb. 20, 1975, 2507172

Int. Cl.² G01T 1/161

U.S. Cl. 250—303 **14 Claims**



1. In a device for measuring the wear of a radioactively marked machine component by sensing the presence of radioactive wear fragments in a lubricant; said device having a flow-through chamber; inlet means for tangentially introducing the lubricant into the flow-through chamber; a radiation detector at least partially surrounded by the flow-through chamber; and outlet means for removing the lubricant from the flow-through chamber; the improvement comprising

a. an outer hollow cylinder, having a closed radial end wall and an axis;

b. an inner hollow cylinder having a closed radial end wall and an outer diameter smaller than the inner diameter of said outer hollow cylinder; said inner hollow cylinder being supported coaxially within said outer hollow cylinder; the space between the two cylinders constituting said flow-through chamber;

c. means for supporting said outer hollow cylinder in a substantially horizontal orientation;

d. a vacuum vessel positioned in said inner hollow cylinder; said radiation detector being supported within said vacuum vessel coaxially with said axis;

e. heat conducting means at least partially surrounding said radiation detector within said vacuum vessel for transmitting heat into the outer environment; and

f. a radiation shield assembly surrounding and secured to said cylinders; said radiation shield assembly being formed of a first shield part protecting said flow-through chamber and said detector from natural environmental radiation and a second shield part protecting said flow-through chamber and said detector from the radioactive radiation emitted by the machine component.

4,027,158

ELECTROPHOTOGRAPHIC APPARATUS COMPRISING PRE-DEVELOPMENT CHARGE REDUCING MEANS

Karl Hans Reiss, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Continuation of Ser. No. 507,488, Sept. 19, 1974, abandoned. This application July 30, 1976, Ser. No. 710,112

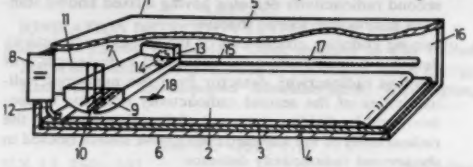
Claims priority, application Germany, Sept. 20, 1973, 2347414

Int. Cl.² G03G 13/22

U.S. Cl. 250—315 R **3 Claims**

1. In an apparatus for electrophotographic image reproduction including means for exposing an electrically charged

photo-semiconductor layer to dispersed rays for forming a charge image; means for reducing the charge on the layer prior to development; and means for rendering said charge image visible, the improvement comprising; said second-mentioned means including corona discharge means having a bar-



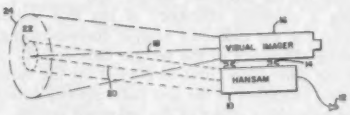
like electrode; said bar-like electrode having a gap extending along the longitudinal direction of said electrode; and a cassette containing said electrode, said electrode being movable transversely of a side edge of a plate supporting said semiconductor layer.

4,027,159

COMBINED USE OF VISIBLE AND NEAR-IR IMAGING SYSTEMS WITH FAR-IR DETECTOR SYSTEM

Stephen G. Bishop, Arlington, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 20, 1971, Ser. No. 191,132
Int. Cl.² G01J 1/00
U.S. Cl. 250—338 **8 Claims**



1. The combination of a visual imaging device and a HANSAM as a simultaneously operated integral unit, the unit being formed so that the field of view of said Hansam lies at the center of the field of view of said imaging device, with a visual image formed by said visual imaging device, and an audio output signal produced by said HANSAM.

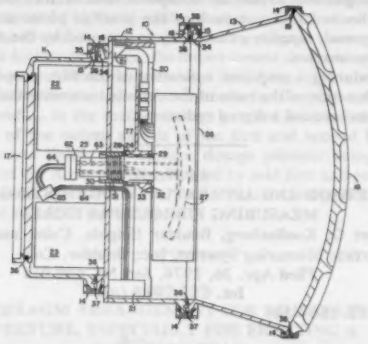
4,027,160

INFRARED DETECTION SYSTEM WITH PARALLEL STRIP RETICLE MEANS

John B. Driffield, Rexdale; Howard S. Kerr, Scarborough; Richard M. Penrose, Brampton, and Anthony C. Stonell, Rexdale, all of Canada, assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 18, 1971, Ser. No. 144,282
Int. Cl.² G01J 1/00
U.S. Cl. 250—339 **2 Claims**

1. An optical system for infrared detection comprising: a viewing lens; a mirror having a focal length, said mirror being positioned to receive the light passed by said viewing lens; a plurality of detector cells positioned to lie in the focal length of said mirror; reticle means positioned on said detector cells whereby said optical system differentiates between infrared radiation from large sources and point sources, wherein said mirror is a spherical mirror having an overcoat of silicon monoxide thereby providing maximum reflectivity in the wavelength region of 3 to 5 microns, wherein said viewing lens is an aspheric corrector shaped to correct said optical system for spherical aberration, said lens comprising optical silicon having a cut-on wavelength of approximately one micron thereby excluding radiation of less than one micron from said optical system, and wherein said reticle means is positioned between said mirror and said detector cells, said reticle means



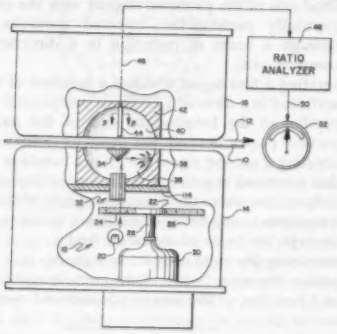
comprising a sapphire substrate having a reticle of parallel strips of an opaque material thereon.

4,027,161

MINIMIZING WAVE INTERFERENCE EFFECTS ON THE MEASUREMENT OF THIN FILMS HAVING SPECULAR SURFACES USING INFRARED RADIATION

Paul Williams, and Jon Francis Pugh, both of Columbus, Ohio, assignors to Industrial Nucleonics Corporation, Columbus, Ohio

Filed Apr. 5, 1976, Ser. No. 673,534
Int. Cl.² G01J 1/00
U.S. Cl. 250—339 **54 Claims**



1. A method of measuring a property of an infrared radiation-transmissive film having specular surfaces, comprising the steps of

generating first and second infrared radiations having wavelengths selected so that one of the radiations is subject to greater absorption in the film material than the other radiation,

directing beams of each of the radiations from a multiplicity of points to a surface of the film at a broad spectrum of incidence angles so that the beams traverse a multiplicity of paths through the film constituting a broad spectrum of path lengths,

intercepting radiations leaving the film and redirecting the intercepted radiations from a multiplicity of points to a surface of the film at a broad spectrum of incidence angles so that the redirected radiations also traverse a multiplicity of paths through the film constituting a broad spectrum of path lengths,

detecting each of the first and second radiations with detecting means so arranged with respect to the directing

and redirecting points that detected components of each radiation are added at substantially all possible phase angles and so that the components of each of the respective radiations at each of the possible phase angles approach equality of intensity as detected by the detecting means and

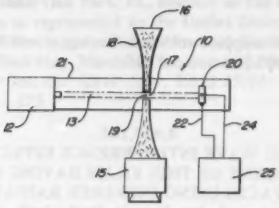
producing a response indicative of the film property as a function of the ratio of the detected intensities of the first and second infrared radiations.

4,027,162

METHOD AND APPARATUS FOR ORIENTING AND MEASURING FIBROUS PARTICLES

Robert G. Knollenberg, Boulder Heights, Colo., assignor to Particle Measuring Systems, Inc., Boulder, Colo.

Filed Apr. 26, 1976, Ser. No. 680,011
Int. Cl.² G01J 1/00
U.S. Cl. 250—345 **13 Claims**



1. A method for measuring elongated, fibrous particles comprising:

orienting the particle along a common axis with the longitudinal axis of the particles aligned with the common axis;

sequentially passing the oriented particles transversly through a beam of radiation in a direction along the common axis;

generating a first signal which is a function of the radiation scattered in a direction having a component substantially parallel to the longitudinal axis of the particle as the particle passes through the beam of radiation;

generating a second signal which is a function of the radiation scattered in a direction having a component substantially transverse to the longitudinal axis of the particle and transverse to the beam of radiation as the particle passes through the beam of radiation; and

determining the ratio of the two signals;

whereby, the aspect ratio of the particle can be established as a function of the measured scattered radiation.

4,027,163

METHOD OF COMPENSATING FOR QUENCHING EFFECT OF SUBSTANCE CONTAINED IN A SAMPLE GAS THE RADIOACTIVITY OF WHICH IS TO BE MEASURED BY A RADIOACTIVITY DETECTOR AND APPARATUS FOR PERFORMING THE SAME

Tomo Saito, Sagamihara; Kazuo Watanabe, Yokohama, and Naotake Morikawa, Tokyo, all of Japan, assignors to Sagami Chemical Research Center, Tokyo, Japan

Filed Jan. 15, 1975, Ser. No. 541,250
Claims priority, application Japan, Jan. 25, 1974, 49-10114
Int. Cl.² G01T 1/20; G01D 18/00
U.S. Cl. 250—363 R **5 Claims**

1. A method of correcting for the quenching effect of a substance contained in a sample gas, the radioactivity of which is to be measured by a radioactivity detector, comprising the steps of:

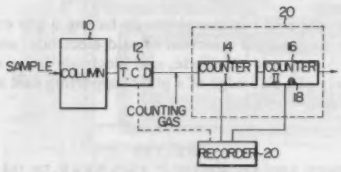
measuring the radioactivities of samples each having a known radioactivity and each having a different quenching effect by a first radioactivity detector;

obtaining counting efficiencies of the first radioactivity detector for the various quenching effects on the basis of the measured radioactivities;

plotting the counting efficiencies of the first radioactivity detector along one axis of orthogonal coordinates;

measuring the radioactivities of the same samples by a second radioactivity detector having a fixed known standard radioactive source therein;

obtaining counting efficiencies of the second radioactivity detector by subtracting the measured radioactivities of the first radioactivity detector from the measured radioactivities of the second radioactivity detector respectively and by dividing the result of the subtractions by the radioactivity of the standard radioactive source housed in the second radioactivity detector;



plotting the counting efficiencies of the second radioactivity detector along the other axis of the orthogonal coordinates and plotting a correction curve on the basis of the two sets of counting efficiencies;

repeating the preceeding steps for an unknown sample to obtain a counting efficiency of the second radioactivity detector for the unknown sample; and

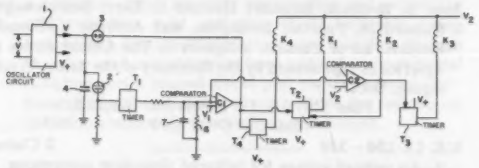
obtaining a counting efficiency of the first radioactivity detector for the unknown sample corresponding to the counting efficiency of the second radioactivity detector from the correction curve to correct for the variation of counting efficiency of the first radio activity detector due to the quenching effect of the unknown sample.

4,027,164

CIRCUITRY FOR CONTINUALLY MONITORING RADIATION DETECTION SYSTEMS

Theodore E. Larsen, Edina, and Stanley S. Kintigh, Hopkins, both of Minn., assignors to Detector Electronics Corporation, Edina, Minn.

Filed May 14, 1975, Ser. No. 577,420
Int. Cl.² G01J 1/42
U.S. Cl. 250—372 **6 Claims**



1. Circuitry for continually monitoring radiation detection systems including:

a. a radiation detection unit arranged and constructed to generate a signal in response to radiation striking the same;

b. a source of radiation arranged to emit radiation to strike said radiation detection unit;

c. control means including signal comparing means receiving the signal from said detection unit, said control means arranged to excite said radiation source at a first predetermined level of said signal and terminating excitation of said radiation source at a second predetermined level of said signal;

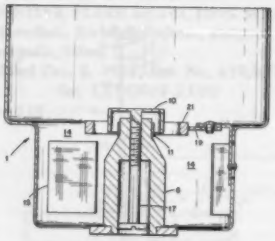
d. means for providing a predetermined control signal to said signal comparing means of said control means; and,
e. means for determining the operative state of said source of radiation.

4,027,165

IONIZATION DETECTION SYSTEM FOR AEROSOLS

Martin E. Jacobs, Chillicothe, Ohio, assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Feb. 17, 1976, Ser. No. 658,807
Int. Cl.² G01T 1/18
U.S. Cl. 250—381 8 Claims



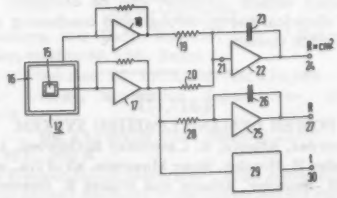
1. In a system for detecting colloidally suspended particles in a gas, said system including a measuring ionization chamber which is open to said gas, said chamber having a pair of spaced electrodes for establishing an electric field therebetween, a source of radiation for ionizing molecules of said gas in said regions, and a first radiation shield positioned in partial overlap with said source for preventing part of said radiation from penetrating said region, the improvement comprising:
a second radiation shield mounted between said first shield and said region, and means responsive to changes in ambient temperature for supporting the second shield and moving the same relative to the first shield to offset temperature-induced variations in the sensitivity of said chamber.

4,027,166

RADIOLOGICAL MEASURING ARRANGEMENT

Horst Aichinger, Furth, and Walter Sladek, Erlangen, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Apr. 21, 1975, Ser. No. 570,161
Claims priority, application Germany, May 2, 1974, 2421243
Int. Cl.² H05G 1/30
U.S. Cl. 250—416 R 5 Claims



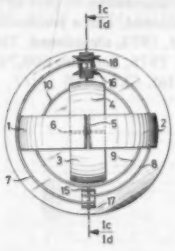
1. In a radiological measuring arrangement for the X-ray dosage load applied to a patient, including an X-ray tube having a focusing diaphragm housing; a first measurement field arranged on said housing, said field being selected to be so large to encompass the entire X-radiation emanating from the primary beam focus even at a maximum beam field size, and of which the portion transversed by the X-radiation conforms to the currently focused beam field size, and including means for forming a signal corresponding to the surface dosage product; and a second beam measurement field adapted to be fully traversed by the X-radiation at even the smallest beam field size and including means for forming a signal corresponding to the incidence dosage, the improvement comprising: said first and second beam measurement field lying concentrically to each other in one plane; and means for forming a signal corresponding to the surface dosage product from producing the sum of the output signals of the first and second beam measurement fields, said surface dosage product being the product of the X-ray dosage obtained by said first and second measurement fields and the surface of said measurement field subjected to said X-radiation.

4,027,167

DIAPHRAGM ARRANGEMENT FOR ADJUSTABLE APERTURE, ESPECIALLY FOR ERECTING A RADIATION BEAM

Max Pollermann, Julich, Germany, assignor to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung, Julich, Germany

Filed June 27, 1975, Ser. No. 590,792
Claims priority, application Germany, June 28, 1974, 2431115
Int. Cl.² G21F 5/04
U.S. Cl. 250—513 18 Claims



1. In an adjustable radiation diaphragm device; a support, spherical shell diaphragm elements movably mounted on the support and defining a variable aperture for defining a beam of radiation emanating from a source stationary relative to said support, said spherical shell diaphragm elements being in the form of ball sections concave toward a common mid point near the source of radiation, and journalling means supporting said spherical shell diaphragm elements for pivotal movement about axis means passing through said common mid point in order to form continuously variable diaphragm opening adjustable in size thereby.

4,027,168

RAPID SHUTTER MECHANISM

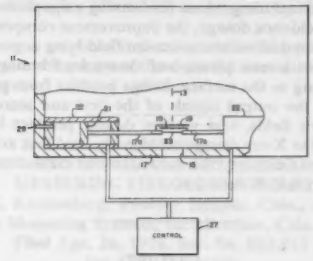
Richard E. Ely, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sept. 9, 1975, Ser. No. 611,771
Int. Cl.² G21F 5/04
U.S. Cl. 250—514 2 Claims

1. A propagator of electromagnetic beams including a member with an aperture for traverse of an electromagnetic beam therethrough comprises:
a shutter mechanism including a pair of plates slidably disposed on said member and being in an overlapped relation for closing said aperture, a pair of cylinders disposed thereon and provided with pistons oppositely secured to said plates for actuating said plates apart to an

open position, a rupture link secured between said pistons to retain said plates in overlapped relation, and,

a control with a source in parallel communication to apply successive pressures to said pistons, to retain the plates in



closed position, to apply stress to said link limited by the yield strength thereof as the beam achieves normal energy value, and to rupture said link for rapid opening of said plates to provide a substantially step function exit of the beam.

4,027,169

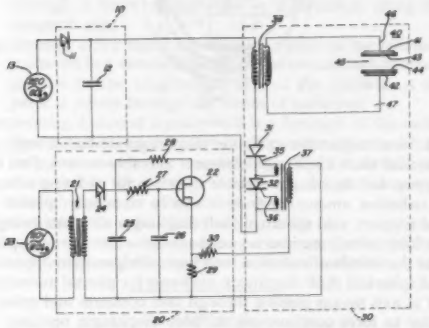
HIGH FREQUENCY POWER SUPPLY

Frank Eugene Lowther, Severna Park, Md., assignor to Union Carbide Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 456,396, March 29, 1974, abandoned, and a continuation-in-part of Ser. No. 509,016, Sept. 25, 1974, abandoned, and a continuation-in-part of Ser. No. 534,568, Dec. 19, 1974, abandoned. This application Aug. 28, 1975, Ser. No. 608,762

Int. Cl.² C01B *13/11*

U.S. Cl. 250—536 **7 Claims**



1. A corona generator system for supplying at least 40,000 watts average power to a corona cell which comprises:

a. a source of DC power;

b. a transformer having a low voltage primary winding and a high voltage secondary winding with a turns ratio adapted to provide a high voltage power pulse across said secondary winding from a relatively low voltage impressed across said primary winding of between about 150 to 600 volts DC;

c. at least two SCR's connected in a series circuit relationship with said source of DC power and said low voltage primary winding, each of said SCR's being unequal to each other with respect to their forward voltage drop characteristic;

c'. means for pulsing the gates of said SCR's at a desired frequency;

d. said corona cell having spaced electrodes with a surface area large enough to generate a corona discharge of at least said 40,000 watts of average power and for generating a reverse commutating voltage of sufficient duration for turning off at least one of said SCR's within each pulse period; said corona cell representing the only commutating means for said SCR's in said system.

4,027,170

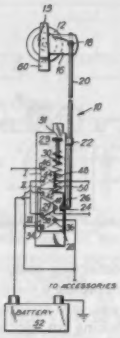
MOTOR VEHICLE EQUIPMENT

Jesse R. Hollins, 40 Stoner Ave., Great Neck, N.Y. 11021

Continuation of Ser. No. 445,121, Feb. 25, 1975, Pat. No. 3,920,937, which is a division of Ser. No. 318,377, Dec. 26, 1972, Pat. No. 3,887,818. This application Oct. 1, 1975, Ser. No. 618,470

Int. Cl.² H01H *27/00*

U.S. Cl. 307—10 R **3 Claims**



1. A motor vehicle ignition switch comprising an ignition key receiving lock cylinder adapted to receive an ignition key, a conducting arm insulatably mounted to said lock cylinder, means connecting said conducting arm in circuit with a source of electrical energy, a conducting arm mover element responsive to the position of said ignition key within said ignition key receiving lock cylinder, a first switch contact, a first electrically energizable motor vehicle accessory, means placing said first electrically energizable motor vehicle accessory in circuit with said first switch contact, a second switch contact, a second electrically energizable motor vehicle accessory, means for placing said second electrically energizable motor vehicle accessory in circuit with said second switch contact, said conducting arm biased to engage said second switch contact when said ignition key is not positioned in said ignition key receiving lock cylinder so that said second electrically energizable motor vehicle accessory is energized by said source of electrical energy through said conducting arm and said second switch contact, said conducting arm mover element adapted to urge said conducting arm into contact with said first switch contact when said ignition key is positioned in said ignition key receiving lock cylinder so that said first electrically energizable motor vehicle accessory can be energized by said source of electrical energy through said conducting arm and said first switch contact.

4,027,171

POWER DEMAND LIMITING SYSTEM

Joe B. Browder, Atlanta; R. Courtenay Bythewood, Lithonia, and Walter R. Hensley, Stone Mountain, all of Ga., assignors to Joe B. Browder, Atlanta and Walter R. Hensley, Stone Mountain, both of, Ga.

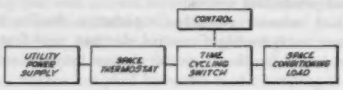
Filed Aug. 13, 1975, Ser. No. 604,440

Int. Cl.² H02J *13/00*

U.S. Cl. 307—39 **29 Claims**

1. A power demand limiting system for limiting peak power demand of a space conditioning load adapted to be coupled with an electric utility power supply through space temperature responsive switching means comprising, in combination,

timer means for cyclically coupling and uncoupling the space conditioning load with said electric utility power supply



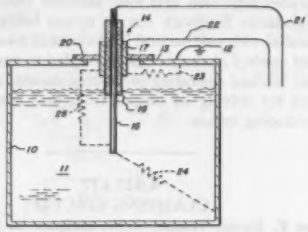
through the space temperature responsive switching means, and timer control means for selectively energizing and deenergizing said timer means.

4,027,172

RESISTIVE FLUID DETECTING MEANS

William B. Hamelink, Richfield, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Oct. 2, 1975, Ser. No. 618,857
Int. Cl.² G01F *23/00*
U.S. Cl. 307—118 **17 Claims**



1. A resistive fluid detecting means, including: probe means having three electrically conductive areas with each of said areas normally electrically insulated from the other of said areas; said probe means adapted to be mounted into a container to detect the presence of a resistive fluid within said container; electric power supply means connected to a first and a second of said electrically conductive areas and capable of establishing a first resistively conductive path through said resistive fluid; control means including output switch means; and said control means including input circuit means connected to a third of said conductive areas and capable of establishing a second and a third resistively conductive paths through said resistive fluid; said second conductive path normally being established through said resistive fluid when said fluid is present to operate said output switch means, and the establishment of either of said other conductive paths wherein an effective shunt current flows causing said output means to become non-operative.

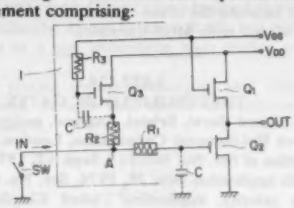
4,027,173

GATE CIRCUIT

Kosei Nomiya, and Tadao Kikuchi, both of Tokyo, Japan, assignors to Hitachi, Ltd., Japan

Filed Nov. 21, 1975, Ser. No. 634,188
Claims priority, application Japan, Nov. 22, 1974, 49-133655
Int. Cl.² H02H *9/04;* **H03K** *3/353*
U.S. Cl. 307—200 B **6 Claims**

1. In a semiconductor integrated circuit comprising:
first and second field-effect transistors having their source and drain terminals connected in series between first and second reference voltage terminals;
an output terminal connected to said first and second field-effect transistors;
an input terminal to which a voltage input signal is applied;
a first resistor connected between said input terminal and the gate of said second transistor for protecting the gate of said second field-effect transistor from dielectric breakdown-inducing high voltage surges applied at said input terminal; and
a third field effect transistor coupled between said second reference voltage terminal and said input terminal;
the improvement comprising:



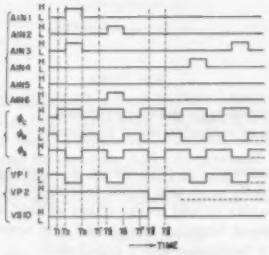
a second resistor connected between said third field effect transistor and said input terminal for suppressing noise voltage surges applied at said input terminal and thereby providing protection for said third field effect transistor.

4,027,174

DYNAMIC DECODER CIRCUIT

Yoshihiro Ogata, Zama, Japan, assignor to Toko Incorporated, Tokyo, Japan

Filed June 30, 1976, Ser. No. 701,125
Claims priority, application Japan, July 4, 1975, 50-81919
Int. Cl.² H03K *19/08, 19/34;* **G11C** *8/00, 15/04*
U.S. Cl. 307—205 **4 Claims**



1. A dynamic decoder circuit which comprises:
a. a first complementary MOS transistor circuit means including a first MOS transistor of a first channel type and a plurality of second MOS transistors of a second channel type having the drains thereof connected to the drain of said first MOS transistor, wherein address signal or signals are selectively applied to the gates of said second MOS transistors and a first timing signal is imparted to the gate of said first MOS transistor;
b. a second complementary MOS transistor circuit means including a third MOS transistor of said second channel type and a fourth MOS transistor of said first channel type having a drain thereof connected to that of said third MOS transistor, the gate of said third MOS transistor being coupled to the connection point between the drain of said first MOS transistor and those of said second MOS transistors, wherein said first timing signal is imparted to the gate of said fourth MOS transistor and a second timing signal is applied to the source of the third MOS transistor; and
c. a third complementary MOS transistor circuit means including a fifth MOS transistor of said first channel type and a sixth MOS transistor of said second channel type having the drain thereof connected to that of said fifth MOS transistor, the gate of said fifth MOS transistor being coupled to the connection point between the drain

of said third MOS transistor and that of said fourth MOS transistor, wherein a third timing signal is imparted to the gate of said sixth MOS transistor, and the output of said dynamic decoder circuit is available at the connection point between the drain of said fifth MOS transistor and that of said sixth MOS transistor.

4,027,175

THRESHOLD LOGIC GATES

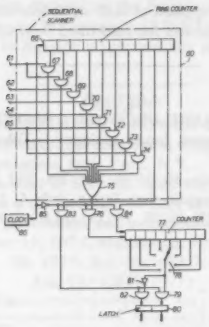
Stanley Leonard Hurst, Bristol, England, assignor to National Research Development Corporation, London, England

Continuation of Ser. No. 505,513, Sept. 12, 1974, abandoned. This application Feb. 25, 1976, Ser. No. 661,265

Claims priority, application United Kingdom, Sept. 20, 1973, 44143/73

Int. Cl.² H03K *19/42, 23/00*

U.S. Cl. 307—211 **4 Claims**



1. A threshold logic gate comprising:

a plurality of activable input terminals;

a counter;

scanning means for performing a scanning operation to sequentially scan said input terminals and connected to said counter to add to the count in said counter as each active input terminal is scanned, the scanning operation having a beginning and a conclusion;

means responsive to the count in said counter for providing an output signal at the conclusion of the scanning operation indicating whether the count in the counter exceeds a predetermined value; and

means for resetting the counter at the beginning of the scanning operation.

4,027,176

SENSE CIRCUIT FOR MEMORY STORAGE SYSTEM

Klaus Heuber, Boeblingen; Wilfried Klein, Holzgerlingen; Knut Najmann, Gaertringen; Rolf Remshardt, Boeblingen, and Siegfried K. Wiedmann, Stuttgart, all of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 26, 1975, Ser. No. 635,539

Claims priority, application Germany, Dec. 19, 1974, 2460146

Int. Cl.² H03K *5/20, 3/286*

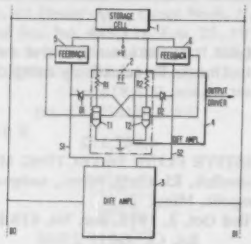
U.S. Cl. 307—355 **12 Claims**

1. A sensing circuit comprising,

a differential amplifier having means for receiving differential input signals and a pair of means for producing differential output signals,

means for producing a latched operation coupled to said output signal producing means, said latched operation producing means including a first and second load element means, said first load element means coupled to one of said output signal producing means and said second load element means coupled to the other of said output signal producing means,

first and second variable impedance feedback circuit means, each having a control element, said first variable impedance feedback circuit means being connected in



parallel with said first load element means said second impedance feedback circuit means being connected in parallel with said second load element means and each of said control elements being coupled to and controlled by said latched operating producing means, and

means for driving an output from said latched operation producing means.

4,027,177

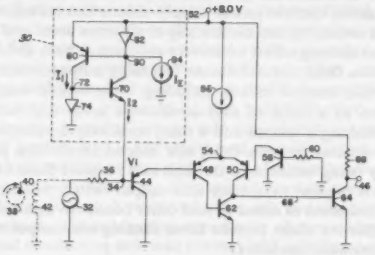
CLAMPING CIRCUIT

William F. Davis, Tempe, Ariz., assignor to Motorola, Inc., Chicago, Ill.

Continuation of Ser. No. 555,466, March 5, 1975, abandoned. This application Aug. 5, 1976, Ser. No. 711,916

Int. Cl.² H03K *5/08;* **H03F** *3/45;* **H03G** *11/00;* **H03L** *1/10*

U.S. Cl. 307—237 **8 Claims**



1. An integrated circuit for preventing transient substrate current injection comprising:

a. a semiconductor substrate of P conductivity type,

b. a layer of N conductivity type disposed over said substrate,

c. isolating means disposed into said layer for forming a plurality of isolated regions,

d. first means for coupling a voltage supply of a given magnitude and polarity to said semiconductor substrate,

e. second means coupled to at least one of said plurality of isolated regions for coupling an electrical signal thereto, said electrical signal having a magnitude and polarity capable of forward biasing the PN junction formed between said semiconductor substrate and a portion of said at least one of said plurality of isolated regions,

f. clamping circuit means to coupled to said at least one of said plurality of isolated regions for preventing said PN junction from becoming forward biased as a result of said electrical signal, said clamping circuit means including a

clamping transistor for providing a high impedance state and a low impedance state in accordance with the amount of its emitter current, semiconductor junction means having first and second terminals, a first node coupled to said first terminal and to the base terminal of said clamping transistor, said second terminal being coupled to said voltage supply, regenerative semiconductor feedback circuit means coupled between said clamping transistor collector terminal and the first node for increasing current flow at the first node in response to the clamping transistor being driven to a lower impedance state in response to said electrical signal being coupled to the emitter terminal of said clamping transistor.

4,027,178

CIRCUIT FOR GENERATING SYNCHRONIZATION SIGNALS

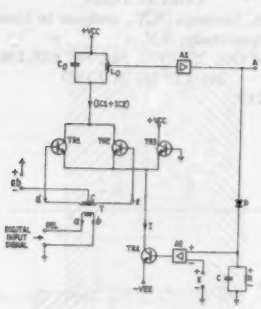
Douglas Stanley Larner, Maidenhead, England, assignor to Plessey Handel und Investments A.G., Switzerland

Filed Dec. 10, 1975, Ser. No. 639,482

Claims priority, application United Kingdom, Dec. 18, 1974, 54816/74

Int. Cl.² H03K *1/17, 5/13;* **H03B** *1/00*

U.S. Cl. 307—269 **4 Claims**



1. A circuit for generating synchronization signals from a digital data pulse train handling non-return-to-zero bits having a bit period of T, the circuit comprising in combination,

a fullwave rectifier means for receiving a digital data pulse train and producing a rectified output waveform corresponding to the digital data pulse train transitions and including a bias signal responsive means for controlling the amplitude of said rectified output waveform,

an oscillatory circuit tuned to oscillate with period T, fed by said rectifier output waveform and stimulated by the transitions of said rectified output waveform to produce said synchronization signals and a bias level generator means for generating a bias signal proportional to the amplitude of said synchronization signals, and for applying the same to said bias signal responsive means.

4,027,179

HIGH REPETITION RATE INJECTION LASER MODULATOR

Hirohisa Kawamoto, Kendall Park, N.J., and David Joseph Miller, III, Philadelphia, Pa., assignors to RCA Corporation, New York, N.Y.

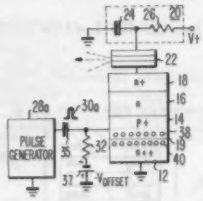
Filed Aug. 28, 1975, Ser. No. 608,513

Int. Cl.² H03K *1/18*

U.S. Cl. 307—296 R **3 Claims**

1. In a pulse generator of the type including a carrier injected avalanche device having a control junction, said avalanche device being connected to charge storing means for dischargeably accumulating a charge to thereby reverse bias said avalanche device to a bias level establishing an electric field within said avalanche device having a magnitude substantially equal to but not exceeding the critical magnitude of electric field required to cause a trapped plasma in said avalanche device, means for injecting carriers into said avalanche device at said control junction to thereby increase the magnitude of said electric field in said avalanche device to exceed said critical magnitude and thus cause a trapped plasma in said device, said avalanche device being normally in a high impedance state but in a low impedance state during avalanche breakdown,

said charge storing means discharging said charge as a current pulse through said device in response to said trapped plasma,



said avalanche device resuming a high impedance state after the discharge of said charge,

said current pulse causing carriers to accumulate across said control junction, thereby forward biasing said junction until the depletion of said carrier accumulation; the improvement therewith comprising:

biasing means, connected across said control junction, for reverse biasing said control junction to thereby substantially instantaneously deplete said carrier accumulation.

4,027,180

INTEGRATED CIRCUIT TRANSISTOR ARRANGEMENT HAVING A LOW CHARGE STORAGE PERIOD

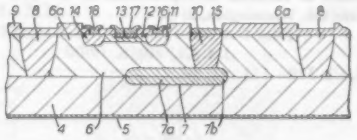
Arthur Edward Ring, Biggleswade, England, assignor to Plessey Handel und Investments A.G., Switzerland

Filed Dec. 31, 1975, Ser. No. 645,705

Claims priority, application United Kingdom, Jan. 10, 1975, 01046/75

Int. Cl.² H01L *27/06*

U.S. Cl. 307—303 **5 Claims**



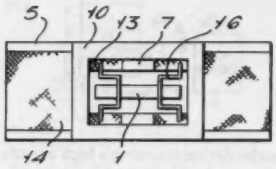
1. A transistor arrangement having a relatively low charge storage period comprising, a semiconductor substrate of P type conductivity having an electrically conductive layer formed on one of the major surfaces thereof and a semiconductive layer of N type conductivity formed on the other major surface thereof; a first N+ type region situated at the interface of the substrate and the N type layer; a second N+ type region formed in the surface of the N type layer and extending to the first region; a P type region formed in the surface of the N type layer, the first region being partially overlapped by the P type region; two spaced-apart P+ type regions formed in the surface of the N type layer, each of the P+ type regions being contiguous with and situated at opposite sides of, the P type region; a third N+ type region formed in the surface of the P type region; electrical contacts for the second, third, and each of the P+ type regions; and a protec-

tive oxide layer formed on the exposed regions of the surface of the N type layer.

4,027,181
HOUSING AND SUPPORT FOR PIEZO-ELECTRIC RESONATOR

René Moreillon, Bienne, and Claude Weber, Le Landeron, both of Switzerland, assignors to Societe Suisse pour l'Industrie Horlogere (SSIH) Management Services S.A., Bienne, Switzerland

Filed July 14, 1975, Ser. No. 595,501
Claims priority, application Switzerland, Aug. 20, 1974, 11321/74
Int. Cl.² H01L *41/04*
U.S. Cl. 310—9.4 **7 Claims**

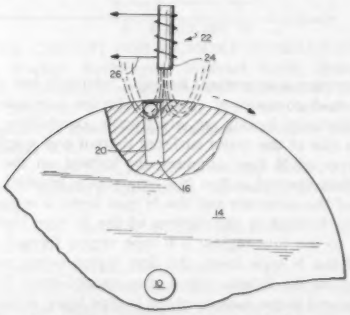


1. A piezo-electric resonator assembly comprising a rectangular piezo-electric bar and a frame, said bar being mounted within a cavity of said frame, said frame being formed of a multi-layered insulating material and including two cover members for enclosing said bar in said frame and a metallized conductive layer extending from the exterior of said frame to the interior thereof, said resonator assembly further comprising a suspension means for suspending said bar within said cavity and for providing the electrical conductivity between said metallized conductive layer and said bar, said suspension means including at least two thin conductors both extending laterally across and confined in the plane of a single face of said bar and being attached to said bar continuously along lateral lines formed by contact between the thin conductors and the bar, said plurality of thin conductors each including suspension portions extending laterally outwardly on opposite sides of said bar with each of said opposite suspension portions being attached to said metallized conductive layers.

4,027,182
RATE INDEPENDENT PULSE GENERATOR

Leland W. Sprinkle, Springfield, Va., assignor to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Oct. 28, 1975, Ser. No. 625,985
Int. Cl.² H02K *39/00*
U.S. Cl. 310—111 **10 Claims**

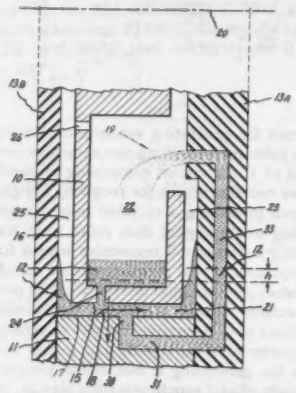


1. A pulse generator comprising a shaft, a motor means connected to said shaft to rotate said shaft at a plurality of rotational velocities, housing means mounted to said shaft to rotate in a plane perpendicular to the longitudinal axis of said shaft, a first magnetic means disposed unattached in said housing means and movably connected by contact therein so as to move radially relative to said shaft as a function of rotational velocity, and pick-up means mounted adjacent the arcuate path of said housing means to detect the presence of said magnetic means and produces a pulse, wherein said pick-up means includes a coil and a further magnetic means to attract said first magnetic means when it is aligned with said pick-up means.

4,027,183
LIQUID-GAS PHASE SEPARATION FOR SELF-CONTAINED LIQUID METAL CURRENT COLLECTORS

Burton D. Hatch, Saratoga, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Oct. 23, 1975, Ser. No. 625,130
Int. Cl.² H02K *13/00*
U.S. Cl. 310—219 **5 Claims**



1. A phase separator for removing ingested gas from liquid metal in the liquid metal current collector of an acyclic machine comprising:

a rotor current collector ring enclosing a fluid chamber therein; a housing surrounding said rotor collector ring and spaced apart therefrom by a predetermined gap forming first and second passageways, said first passageway extending radially along one side of said chamber to a location opening into said chamber and said second passageway extending circumferentially between said housing and said rotor current collector ring, said rotor current collector ring including an opening through its radially-outermost circumferential region permitting liquid communication between the interior region of said chamber and said second passageway;

a third passageway formed in said housing to permit flow of liquid metal from said second passageway to said location opening into said chamber; and

means in gaseous communication with the radially-inward interior region of said chamber to permit egress of gas from said chamber.

4,027,184

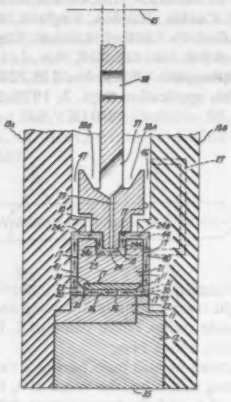
PUMPED SINGLE-PASS RETURN LIQUID METAL COLLECTOR WITH REVERSED CURRENT PATH FOR ACYCLIC MACHINES

James D. Hurley, Saratoga Springs, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Oct. 24, 1975, Ser. No. 625,532

Int. Cl.² H02K *13/00*

U.S. Cl. 310—219 **12 Claims**



1. An acyclic machine comprising:

a stator collector ring including a radially-outer member and an axially-oriented, radially-inner member;

a rotor collector ring rotatable within said stator collector ring;

an intermediate collector electrode including a portion situated between said rotor collector ring and said stator collector ring radially-inner member, said portion abutting said stator collector ring radially-inner member, said intermediate collector electrode further including an axially-oriented electrode member located radially outward of said axially-oriented, radially-inner member of said stator collector ring and abutting said stator collector ring radially-outer member; said intermediate electrode contacting insulation over its entire area except for a strip on the radially-innermost circumferential surface thereof in alignment with the radially-outermost circumferential surface of said rotor collector ring and except for the radially-inner circumferential surface of said axially-oriented electrode member; and

a liquid metal situated between said rotor collector ring and said stator collector ring and substantially filling all passageways between said rotor collector ring and said intermediate electrode so as to provide an electrical current path between said rotor collector ring and the portion of said intermediate electrode situated between said rotor collector ring and said stator collector ring radially-inner member, and between said axially-oriented electrode member and said axially-oriented, radially-inner member of said stator collector ring.

4,027,185

HIGH INTENSITY RADIATION SOURCE

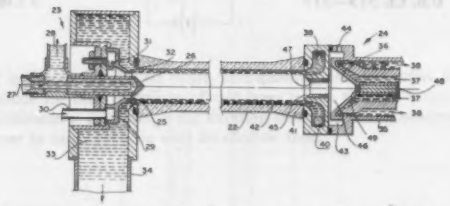
Roy A. Nodwell, and David M. Camm, both of Vancouver, Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Continuation-in-part of Ser. No. 478,872, June 13, 1974, abandoned. This application Sept. 10, 1975, Ser. No. 612,091

Claims priority, application Canada, Apr. 1, 1975, 224438

Int. Cl.² H01J *61/28*

U.S. Cl. 313—35 **11 Claims**



1. Apparatus for providing high intensity radiation comprising:

an elongated cylindrical arc chamber having a transparent portion;

first and second spaced electrode means positioned coaxially within said chamber between which an arc discharge may be established;

means for producing a cylindrical liquid wall within said chamber by injecting a liquid having a vortex motion into said chamber to constrict the arc discharge by cooling the periphery of the arc discharge; and

means for injecting an inert gas having a vortex motion into said chamber through the interior of said cylindrical liquid wall to stabilize the arc discharge.

4,027,186

GAS DISCHARGE DISPLAY DEVICE HAVING PLURAL GROUPS OF CATHODES

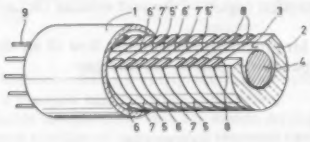
Gerhard Heinrich Friedrich de Vries; Johannes van Esdonk, and Theunis Goos, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 31, 1976, Ser. No. 672,134

Claims priority, application Netherlands, Apr. 11, 1975, 7504323

Int. Cl.² H01J *61/067*

U.S. Cl. 313—217 **10 Claims**



1. A gas-discharge display device having an envelope at least part of which is a light-pervious material, a plurality of cathodes and at least one elongate common anode supported within said envelope, an ionizable medium within said envelope, the cathodes being arranged in a row extending substantially parallel to a said anode, said cathodes being spaced from said anode and being connected together in groups and each being operable to provide between the respective cathode and the anode a gas discharge visible through the light-pervious material, each said group comprising a respective elongate conductor, spaced portions of which constitute said cathodes, the conductors extending substantially coaxially around and along a common core which has an insulating surface, being of substantially the same shape and being substantially uniformly

spaced so that the row of cathodes comprises a cyclic succession of said portions of all the conductors.

4,027,187

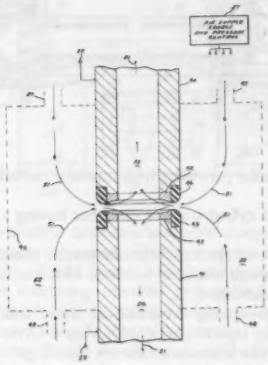
SUPERSONIC SPARK GAP SWITCH

Douglas C. Rabe, Dayton, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Apr. 22, 1976, Ser. No. 679,267

Int. Cl.² H01J *17/04*

U.S. Cl. 313—217 **3 Claims**



1. The improvement in a spark gap switch having a first and a second hollow cylindrical electrode with means for connecting the said electrodes into an electrical circuit, with the said electrodes positioned in axial alignment with the electrode faces of the electrodes in spaced apart relationship providing an annular axial gap therebetween and with an air chamber enclosure connected to an air flow source surrounding the said gap and providing a flow of air through the said gap, the improvement in the said spark gap switch comprising:

a. the said annular axial gap between the said electrode faces being formed to comprise an annular DeLaval nozzle with the converging side of the nozzle adjacent the said air chamber and the expansion side of the nozzle exhausting into the said hollows of the said electrodes;

b. means for limiting the discharge region of the said gap to the expansion region of the said annular DeLaval nozzle; and

c. means for providing a supersonic flow of air through the said expansion region of the said gap.

4,027,188

TUBULAR PLASMA DISPLAY SEAL DESIGN

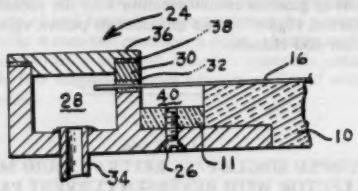
Clark Bergman, Roseville, Minn., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed June 23, 1976, Ser. No. 698,989

Int. Cl.² H01J *61/30*

U.S. Cl. 313—220 **1 Claim**

1. In a tubular plasma display having a base, a plurality of parallel electrodes affixed to the base, a plurality of capillary discharge tubes bonded to the electrodes, a plurality of electrodes overlying said capillary discharge tubes and transverse thereto, and a protective face plate covering the electrodes, discharge tubes and base, further including a manifold chamber affixed to the base wherein at least one end of each capillary discharge tube opens into the chamber, the improvement comprising: an extension of the base by a thickness less than that of the base, extending in a direction toward and abutting



the manifold chamber and removed from contact with the capillary discharge tubes.

4,027,189

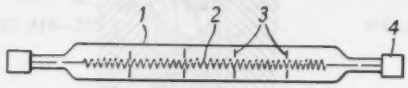
TUNGSTEN HALOGEN LAMP

James Richard Coaton, London, England, assignor to Thorn Electrical Industries Limited, London, England

Continuation of Ser. No. 412,034, Nov. 1, 1973, abandoned, which is a continuation of Ser. No. 219,728, Jan. 21, 1972, abandoned. This application Sept. 3, 1975, Ser. No. 609,974

Int. Cl.² H01K *1/50*

U.S. Cl. 313—222 **8 Claims**



1. A linear tungsten halogen lamp comprising

a tubular light-transmitting bulb having an internal length L and an inside radius r_2 the value of L being equal to, or greater than, about $16r_2$;

a coiled filament in said bulb having a radius r_1, extending axially along said tube, the value of r_2 being greater than the value of r_1 and the temperature difference from said filament to the wall of said bulb being ΔT;

leads for supplying said filament with electrical power; and

a gas filling having an average gas temperature of T in said bulb, said gas filling including halogen having a preselected thermal diffusion coefficient Δ, said halogen, said length L, said radius r_2, and said radius r_1, all being selected so that the magnitude of the quantity

$$\frac{qL\Delta T}{2\sqrt{2}\,(r_2 - r_1)\bar{T}}$$

is equal to or greater than zero and is not greater than 1.0 wherein said halogen is in substantially elemental form.

4,027,190

METAL HALIDE LAMP

Takao Shintani, Tokyo; Satoshi Nagano, Kawasaki; Toshihiko Ishigami, Tokyo, and Hiroki Sasaki, Yokohama, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Sept. 2, 1976, Ser. No. 719,703

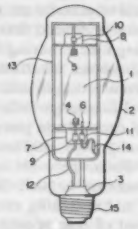
Claims priority, application Japan, Sept. 5, 1975, 50-107110; Mar. 29, 1976, 51-33577; June 17, 1976, 51-70399

Int. Cl.² H01J *61/18*

U.S. Cl. 313—229 **4 Claims**

1. A metal halide lamp including a luminous sealed tube containing a pair of discharge electrodes and having an ionizable inert gas, mercury and halides sealed therein, said halides comprising at least one kind selected from the group consist-

ing of tin chloride, tin bromide and tin iodide, and at least one kind selected from the group consisting of calcium chloride,



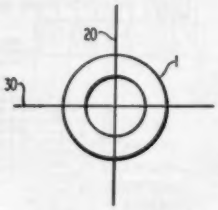
calcium bromide, calcium iodide, strontium chloride, strontium bromide, and strontium iodide.

4,027,191

PHOSPHOR GEOMETRY FOR COLOR DISPLAYS FROM A MULTIPLE GASEOUS DISCHARGE DISPLAY/MEMORY PANEL

Robert F. Schaufele, 1562 Forest Hills Drive, Okemos, Mich. 48864, and Felix H. Brown, 1968 Rutgers Circle, East Lansing, Mich. 48823

Filed Dec. 16, 1970, Ser. No. 98,846
Int. Cl.² H01J *61/16, 61/30, 61/44*
U.S. Cl. 313—487 **31 Claims**



1. In a gaseous discharge display/memory device comprising an ionizable gaseous medium in a gas chamber formed by a pair of opposed dielectric material charge storage members backed by electrode members, the electrode members behind each dielectric material surface being transversely oriented with respect to the electrode members behind the opposing dielectric material surface so as to provide a plurality of electrode intersections, each defining a discharge unit, said units being in open ultraviolet photonic communication through said gas chamber, the improvement wherein at least one of said dielectric members includes photoluminescent phosphor means sensitive to and excited by ultraviolet radiation, said phosphor means being located between said electrode members and said gaseous medium and being excluded from the intersection of electrodes at each discharge unit while being sufficiently adjacent to said intersection so as to be excited by ultraviolet radiation emitted from the gaseous discharge of such unit and emit visible light of a brightness and intensity sufficient for visual display.

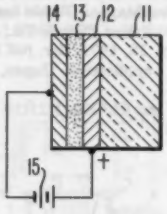
4,027,192

ELECTROLUMINESCENT DEVICE COMPRISING ELECTROLUMINESCENT LAYER CONTAINING INDIUM OXIDE AND/OR TIN OXIDE

Joseph John Hanak, Lawrenceville, N.J., assignor to RCA Corporation, New York, N.Y.

Filed July 18, 1975, Ser. No. 597,215
Int. Cl.² H01J *1/62*
U.S. Cl. 313—498 **10 Claims**

1. An electroluminescent device comprising (a) a homogeneous electroluminescent layer consisting essentially of a solid solution of a cathodoluminescent phosphor normally having a bulk electrical resistivity greater than 10^{11} ohm-centimeters and a quantity of at least one member of the group consisting



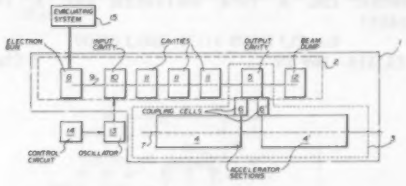
of indium oxide and tin oxide, said quantity being effective to reduce the bulk resistivity of said layer to less than 10^{10} ohm-centimeters, and means for exciting said electroluminescent layer to luminescence with an electric field.

4,027,193

KLYSTRON-RESONANT CAVITY ACCELERATOR SYSTEM

Stanley O. Schriber, Deep River, Canada, assignor to Atomic Energy of Canada Limited, Ottawa, Canada

Continuation-in-part of Ser. No. 554,775, March 3, 1975, abandoned. This application Apr. 26, 1976, Ser. No. 680,537
Claims priority, application Canada, Mar. 4, 1974, 213044
Int. Cl.² H01J *25/10*
U.S. Cl. 315—5.41 **10 Claims**



1. A klystron-resonant cavity accelerator system for accelerating a charged particle beam comprising:

evacuable accelerating section means having a predetermined number of intercoupled resonant cavities mounted about a common accelerator axis to provide an axial beam path for the charged particle beam to be accelerated;

evacuable klystron means having an output resonant cavity and means for passing a bunched electron beam through said output resonant cavity to excite rf fields within said output resonant cavity; and

coupling means for coupling said klystron output resonant cavity to said accelerating section means to energize said accelerating section means, said accelerating section means with said coupling means and said output resonant cavity forming an integral rf coupled resonant cavity system, and said coupling means further connecting said klystron means to said accelerating section means to form a single evacuable system.

4,027,194

CORE MAGNETRON MAGNETIC CIRCUIT HAVING A TEMPERATURE COEFFICIENT APPROXIMATELY ZERO AND PERMEANCE RELATED

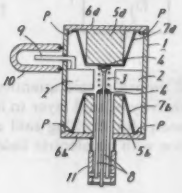
Masaru Yamano, Hirakata, and Toshio Iemura, Kyoto, both of Japan, assignors to Sanyo Electric Co., Ltd., Japan

Filed Oct. 28, 1975, Ser. No. 626,056

Claims priority, application Japan, Oct. 25, 1974, 49-123520

Int. Cl.² H01J 25/50

U.S. Cl. 315—39.71 3 Claims



1. A core type magnetron, comprising a permanent magnet in an anode resonator portion of said magnetron arranged surrounding a cathode portion, a magnetic circuit including said permanent magnet, wherein said permanent magnet has a temperature coefficient which is variable and dependent on the value of said magnetic circuit permeance, and said magnetic circuit is adapted such that said permanent magnet is utilized at the value of permeance of said magnetic circuit where said temperature coefficient is approximately zero.

4,027,195

VOLTAGE SWITCHING DEVICE COMPRISING A GAS DISCHARGE PANEL

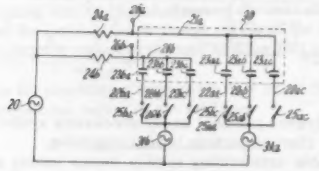
Masamichi Shutoh; Tsunekiyo Iwakawa, and Akira Yano, all of Tokyo, Japan, assignors to Nippon Electric Company Ltd., Tokyo, Japan

Filed Aug. 14, 1975, Ser. No. 604,883

Claims priority, application Japan, Aug. 23, 1974, 49-96745; Sept. 6, 1974, 49-102821; Sept. 20, 1974, 49-108551; Oct. 3, 1974, 49-114532; Oct. 3, 1974, 49-114533

Int. Cl.³ H05B 41/36; H01J 65/00

U.S. Cl. 315—169 TV 5 Claims



1. A voltage switch device operable by a main electric power souce and providing a voltage between a first and second terminal, which comprises:

a first substrate;

a second substrate;

a group of first electrode means on one surface of said first substrate;

a group of second electrode means on one surface of said second substrate, said first and second substrates having their outer edges hermetically sealed with said first electrode means disposed opposite to said second electrode means across a gap for having an ionizable gas introduced therein so that a plurality of control gas discharge cells having a substantially common firing voltage are formed at predetermined positions where said first electrode means face said econd electrode means;

a plurality of resistors having first ends respectively connected to said first electrode means and second ends adapted for connection to said first terminal; and

a plurality of switching means having first ends respectively connected to said second electrode means and second ends adapted for connection to said second terminal, said plurality of control discharge cells being divided into a plurality of groups, each of said plurality of groups including a plurality of subgroups, said second electrode means constituting said discharge cells included in said subgroups being connected to said first ends of mutually different ones of said switching means, said control discharge cells formed of one of said fist electrode means belonging to mutually different ones of said groups.

4,027,196

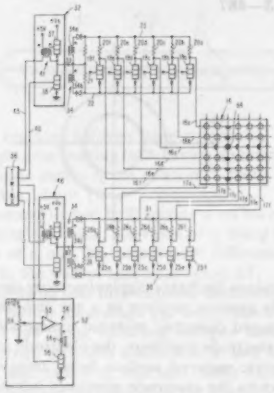
BILATERAL SELECTIVE BURST ERASE SYSTEM

Tony N. Criscimagna, Woodstock, and Michael J. Steinmetz, Hurley, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 12, 1975, Ser. No. 631,254

Int. Cl.² H05B 37/00, 41/00

U.S. Cl. 315—169 TV 10 Claims



1. In a gas panel of the type having light emitting cells formed at crossover points of horizontal and vertical sets of conductors and in which avalanche ionization occurs in a light emitting cell at predetermined conditions of amplitude and width of pulses applied across the conductors of a cell, and having means for selectably producing pulses on said conductors to ignite desired cells by producing said avalanche condition and having circuit means for producing cyclical alternating polarity sustain pulses between said sets of conductors to sustain ignited cells in an ignited state, an erase system for effecting an improved erase action on only selected cells of said display comprising:

first signal generating means for generating a waveform comprised of a first series of low amplitude-wide erase pulses of one polarity, the amplitude of said pulses being ½ of the required magnitude to effect an erase action on an ignited cell;

second signal generating means for generating a waveform comprised of a second series of low amplitude-wide erase pulses of a polarity opposite to said first series, each pulse of said second series being followed by an associated narrow-high amplitude pulse of alternate polarity, each said erase pulses of said second series being ½ of the required magnitude to effect an erase action in an ignited

cell and being time coincident with said erase pulses of said first series;

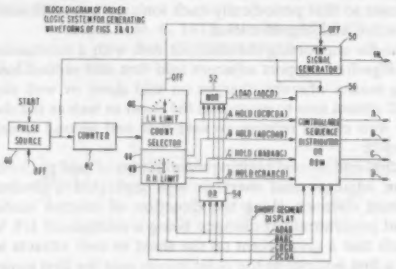
first selection means for applying the signals from said first signal generating means selectably, to any one or more horizontal conductors of said display on which cells to be erased reside; and

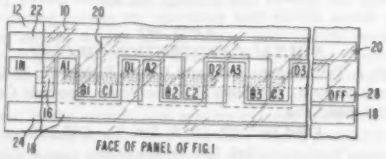
second selection means for applying the signals from said second signal generating means selectably to any one or more vertical conductors of said display on which cells to be erased reside, any ignited cell lying at an intersection of any selected vertical and horizontal conductors being accordingly subjected to an additive pulse waveform of said first and second signal generating means to achieve an erase waveform of a series of bi-polar pulses each having an erase portion of full erase magnitude followed by a narrow high amplitude portion of opposite polarity.

4,027,197
VARIABLE BAR DISPLAY TUBE USING INSULATED ELECTRODES

William E. Coleman, St. Charles, Ill., assignor to NCR Corporation, Dayton, Ohio

Filed Oct. 8, 1975, Ser. No. 620,903
Int. Cl.² H05B 41/14, 37/00
U.S. Cl. 315—169 TV 12 Claims





1. A display means comprising:

an envelope containing an ionizable gas, said envelope having opposed walls formed of an electrically insulating material,

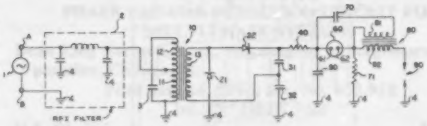
a plurality of conductive electrode arms, on said opposed walls of said envelope, said arms being capacitively coupled to said gas, said arms being mounted in staggered opposed positions on said walls,

driver means for creating a charge within said envelope adjacent at least a first of said arms and for thereafter sequentially applying potentials to at least two sequential arms and said first arm such that the portions of said gas between mutually opposing pairs of at least said two sequential arms and said first arm ionze in sequential repetitive fashion at a rate rapid enough so that all of the gas extending between the extreme two of said arms appears to be ionized continuously to an observer.

4,027,198
CAPACITOR DISCHARGE IGNITION SYSTEM

Irving E. Linkroum, Hancock, N.Y., assignor to The Bendix Corporation, Southfield, Mich.

Filed Aug. 14, 1975, Ser. No. 604,687
Int. Cl.² H05B 37/02, 39/04, 41/36
U.S. Cl. 315—209 CD 9 Claims



1. A capacitor discharge ignition system for igniting fuel in a jet engine comprising:

a transformer having a secondary winding, a primary winding for receiving alternating electric current, and a tertiary winding in series with the primary winding;

a first capacitor electrically connected across the primary and tertiary windings of said transformer;

a second capacitor;

means for rectifying the alternating electric current received from the secondary windings of said transformer and supplying such rectified current to the second capacitor; and

means for periodically discharging the electrical energy stored in said second capacitor, including:

a switching device periodically rendered electrically conductive and electrically nonconductive, said switching device permitting said second capacitor to discharge when conductive and preventing said second capacitor from discharging when electrically nonconducting;

a second transformer having a first winding and a second winding, with said first winding coupled to said switching device; and

a discharge device coupled in series with the second transformer for dissipating the electrical energy from said second capacitor when said switching device is rendered electrically conductive, said discharge device located within the jet engine for igniting fuel therein, whereby the discharge of the second capacitor through the switching device causes igniting of the fuel in the jet engine.

4,027,199
FLASH LAMP MODULATOR SYSTEM

Richard C. Johnson, Pasedena, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed June 11, 1975, Ser. No. 585,947
Int. Cl.² H05B 41/32
U.S. Cl. 315—241 R 4 Claims

1. An improved energy conversion apparatus comprising:

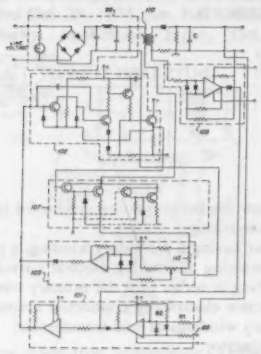
transformer means having a primary winding coupled to a low voltage DC source and switching means,

said transformer means having a secondary winding coupled to chargeable capacitor means,

said switching means being turned on or off in response to electrical signals in the primary and secondary windings, and

detection means for sensing the energy stored in said capacitor means and supplying signals to said switching means to maintain energy stored in said capacitor means at a predetermined level,

wherein said primary and secondary windings of said transformer means are phased so that when said primary winding is conducting said secondary winding is not conducting and vice versa.



4,027,200

HIGH VOLTAGE GENERATING CIRCUIT

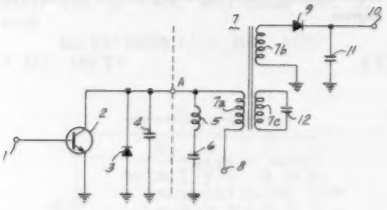
Hiroshi Sahara, Tokyo, and Tamiji Nagai, Kawasaki, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Oct. 16, 1975, Ser. No. 623,106

Claims priority, application Japan, Oct. 21, 1974, 49-127008[U]

Int. Cl.² H01J 29/70

U.S. Cl. 315—411 **8 Claims**



1. A high voltage generating circuit comprising:

a horizontal oscillator developing an output signal at the horizontal sweep frequency;

a flyback transformer;

means for coupling the horizontal oscillator output to the primary of said flyback transformer;

the primary and secondary windings of said flyback transformer being coupled loosely to provide substantial isolation therebetween;

circuit means causing the input resonant frequency of said flyback transformer to be in the vicinity of and higher than the frequency of said horizontal oscillator;

the secondary winding of said flyback transformer developing a substantially sinusoidal voltage having its peak portion flattened; and

means associated with said secondary winding for rectifying said sinusoidal voltage to produce a regulated high voltage DC signal thereof.

4,027,201

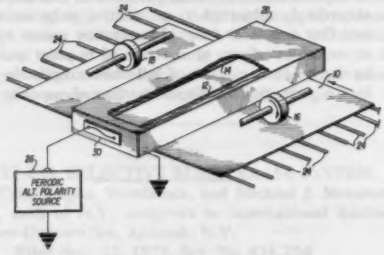
APPARATUS AND METHOD FOR NEUTRALIZING STATIC CHARGES IN SHEET/WEB FEEDING DEVICES

James Lydell Bacon, and Jesse Wayne Spears, both of Boulder, Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 6, 1975, Ser. No. 620,096

Int. Cl.² H05F 3/04

U.S. Cl. 361—213 **19 Claims**



1. Apparatus for neutralizing static electric charge on a sheet or web moving at a velocity Vs relative to said neutralizing apparatus, said neutralizing apparatus comprising:

first means for ionizing gas adjacent said sheet or web;

second means for ionizing gas adjacent said sheet or web;

means electrically connected to said first and second ionizing means for supplying a periodic alternate polarity signal of a frequency *f* to said first and second ionizing means so that periodically each ionizing means produces positive and negative ions;

means for supporting the sheet or web with a substantially charge-free support adjacent said first and second ionizing means whereby charges on said sheet or web alone will attract ions to neutralize the sheet or web as the sheet or web moves relative to said first and second ionizing means;

said first and second ionizing mean points of said gas ionization adjacent said sheet or web separated a predetermined distance along the direction of relative motion, said predetermined distance being a multiple of 1/2 Vs/f such that a given point on the sheet or web attracts ions of a first polarity as the point moves past the first ionizing means and attracts ions of a second polarity as the point moves past the second ionizing means.

4,027,202

VOLTAGE PROTECTION CIRCUIT

Hugh J. Tyler, Santa Ana, and Dennis E. Newell, El Segundo, both of Calif., assignors to Robertshaw Controls Company, Richmond, Va.

Filed Dec. 19, 1975, Ser. No. 642,220

Int. Cl.² H02H 7/08

U.S. Cl. 361—33 **6 Claims**

1. A protection circuit for a device having input switching means for connecting the device to an AC source, said circuit comprising

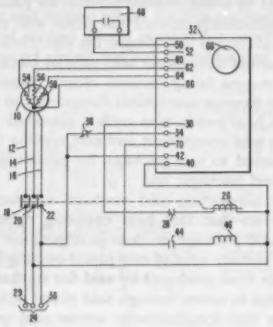
a lower power transformer having a primary winding and a secondary winding, said primary winding adapted to be coupled to the AC source,

first half-wave rectifier means coupled to the secondary winding and responsive to one half of the AC power on the secondary winding for producing a first single polarity voltage,

second half-wave rectifier means coupled to the secondary winding and responsive to the other half of the AC power on the secondary winding for producing a second single polarity voltage which has a magnitude corresponding to the voltage of the AC source,

sensing means energized by the first half-wave rectifier

means and having an input connected to the second half-wave rectifier means for sensig a deviation of the magnitude of the second single polarity voltage from a predetermined voltage, and



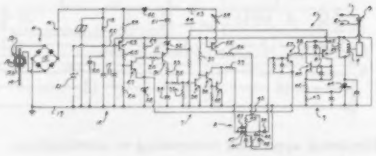
means operated by the sensing means sensing the deviation for operating the switching means to disconnect the device from the AC source.

4,027,203

PROTECTIVE SWITCH DEVICE FOR ELECTRICAL DISTRIBUTION SYSTEMS

Richard J. Moran, and William N. Le Court, both of Milwaukee, Wis., assignors to McGraw-Edison Company, Milwaukee, Wis.

Filed Mar. 6, 1975, Ser. No. 555,947
Int. Cl.² H02H *3/08*
U.S. Cl. 361—98 **29 Claims**



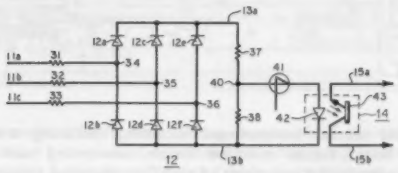
1. In a protective device coupled to an electrical system and including switch means for opening and closing the system, switch opening means for operating said switch means and actuating circuit means for actuating said switch opening means in response to receipt of an input signal, the combination comprising sensing means coupled to said electrical system and producing an output sensing current signal related to the current in the system, said sensing current being of a low milliampere level, overcurrent detection means connected to the sensing means and responsive to predetermined overcurrents in said system for producing a fault signal, a signal processing circuit connected to the overcurrent detection means and to the actuating circuit means for producing an input signal to the actuating circuit means in response to a fault signal, a power supply means for providing power to the protective device and having a rechargeable storage means for storing of electrical power and connected to the current sensing means and charged by the output thereof, said power supply means being connected to the overcurrent detection means for supplying operating power output to the fault detection means and to the signal processing circuit and to the actuating circuit means, said overcurrent detection means and signal processing circuit and actuating circuit means being operable to load and clamp said power supply means at an inoperative level in the presence of said sensing currents, and inhibiting means connected to the output circuit of the detection means for inhibiting an output from the overcurrent detection means to the signal processing circuit until said storage means has been charged to a minimum preselected operating level sufficient to establish said operating power and prevent said clamping at an inoperative level.

4,027,204

PHASE FAILURE DETECTION CIRCUIT FOR MULTI-PHASE SYSTEMS

Dean King Norbeck, York, Pa., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Jan. 28, 1976, Ser. No. 652,918
Int. Cl.² H02H *3/24*
U.S. Cl. 361—1 **4 Claims**



1. A phase failure detection circuit for use with a power system in which multi-phase energy is passed over a plurality of main electrical conductors to energize an electrical load, comprising:

a rectifier circuit, having a plurality of input connections coupled to the main electrical conductors, and having a pair of output connectors for providing a d-c voltage;

a radiation-emitting semiconductor, coupled to the rectifier circuit output connections to produce radiation as a function of the amplitude of the d-c voltage;

a voltage divider circuit coupled to the rectifier circuit output connections, which voltage divider circuit has an intermediate connection coupled to the radiation-emitting semiconductor, to reduce the amplitude of the voltage applied to the radiation-emitting semiconductor;

a unidirectional semiconductor switch, coupled between the intermediate connection of the voltage divider circuit and the radiation-emitting semiconductor;

a radiation-sensitive semiconductor, optically coupled to the radiation-emitting semiconductor, for providing an electrical control signal which varies as a function of incident radiation, which control signal remains above a predetermined reference value so long as the input energy is present on all main conductors; and

a detector stage, coupled to the radiation-sensitive semiconductor, for providing an output signal when the control signal drops below the predetermined reference value, thus providing fail-safe operation of the detection circuit.

4,027,205

ENVIRONMENTALLY PROTECTED ARC WELDING APPARATUS OF THE FORCED VENTILATION TYPE

James E. Frederick, Ellicott City, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 3, 1975, Ser. No. 637,425
Int. Cl.² H05K *7/20*
U.S. Cl. 361—384 **10 Claims**

1. An environmentally protected portable arc welding apparatus comprising:

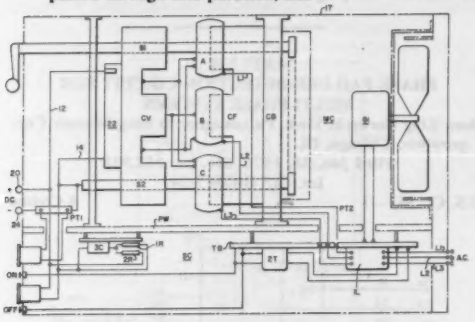
a housing having a first and a second compartment separated by a partition, said first compartment being forced-air cooled, said second compartment being sealed from the atmosphere;

first electrical means of the class H insulation type mounted in said first compartment for providing power to outlet terminals on said housing;

second electrical means mounted in said second compart-

ment for deriving alternating current electrical power from inlet terminals on said housing;

said first electrical means having electrical connections passed through said partition; and



said second compartment including insulating terminal board means mounted therein connecting said input electrical connections of said first electrical means with said electrical means.

4,027,206

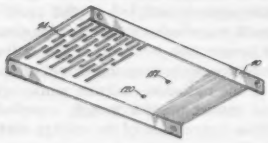
ELECTRONIC COOLING CHASSIS

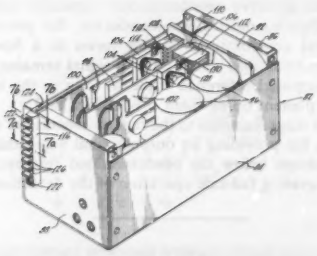
Lawrence Y. Lee, Santa Ana, Calif., assignor to L. H. Research, Santa Ana, Calif.

Continuation-in-part of Ser. No. 544,333, Jan. 27, 1975. This application Sept. 12, 1975, Ser. No. 612,814

Int. Cl.² H05K *7/20*

U.S. Cl. 361—384 **10 Claims**





1. A substantially enclosed package for mounting electronic components, said package including:

a prewired modular subassembly mounted within said enclosed package comprising:

at least one heat damage susceptible component which generates heat at a deleterious level;

a rectangular printed circuit board having two end edges shorter than its two side edges;

a plurality of electronic components mounted directly on said printed board, at least some of which also dissipate heat; and

a heat absorbing and radiating means secured to one end of said printed circuit board and extending substantially entirely across said end, said heat radiating means including:

heat sink means comprising a high heat conductivity metallic member, said heat damage susceptible component being mounted on and in thermal communication with said metallic member, and

fin means for radiating heat from said heat sink means, said fin means comprising a plurality of inexpensive cooling fins which are economical of material separated by uninterrupted parallel air passages directed longitudinally toward the other end of the printed circuit board and toward the electronic components mounted directly on said printed circuit board, said fin means being located closely proximate to said heat damage susceptible component so that an excellent heat conduction path is provided

between said component and said cooling fins;

a fan mounted to said package for producing an air flow within said package; and

means for supporting said modular subassembly in said package so that said heat radiating means is entirely within said package in close juxtaposition with said fan and the surface area of said plural cooling fins is parallel to the air flow produced by said fan so that said air flow is directed in series through said plural uninterrupted air passages and longitudinally across said printed circuit board over said plurality of components mounted directly to the printed circuit board.

4,027,207

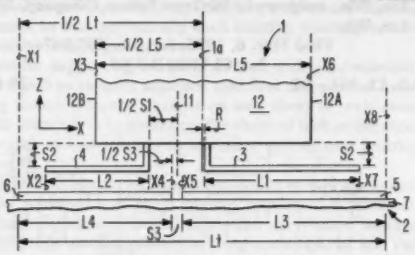
ELECTRICAL SAFETY BYPASS

Charles John Parsons, Endicott, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 3, 1975, Ser. No. 628,432

Int. Cl.² H05K *1/04*

U.S. Cl. 361—404 **11 Claims**



1. Electrical apparatus comprising in combination:

a first electrical device,

first and second terminal means disposed on said first device,

a second electrical device, and

third and fourth terminal means disposed on said second device,

said first and second terminal means being adapted to be in contacting relationship with said third and fourth terminal means, respectively, whenever said first device is oriented in a predetermined first direction relative to said second device, and said first terminal means being adapted to be in contacting relationship with said third and fourth terminal means whenever said first device is oriented in a predetermined second direction relative to said second device, and said first electrical device being a polarized electrical component.

4,027,208

INTERFACING CIRCUIT

Thomas F. Look, New Brighton, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

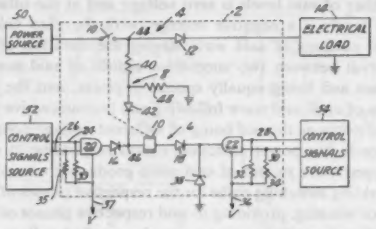
Filed Apr. 14, 1976, Ser. No. 676,760

Int. Cl.² H01H *47/04*

U.S. Cl. 361—194 **6 Claims**

1. An interfacing circuit for use in industrial control systems to provide for operation of an electrical load from a power source including a relay having a winding and a set of normally open contacts; a first circuit portion in which said set of

contacts is connected for providing a current path between the power source and the electrical load when said set of contacts are closed; a second circuit portion for initially energizing said relay winding to cause said set of contacts to close, said second circuit portion including a first buffer circuit and a second buffer circuit, each having at least one control signal input, said first and second buffer circuits connected at opposite ends of said second circuit portion for receiving control signals, said second circuit portion including first and second



unidirectional current conducting devices and said winding electrically connected in series, said first device connecting said first buffer circuit to one end of said winding, said second device connecting said second buffer circuit to the other end of said winding, said first and second devices poled to permit current flow from said first buffer circuit to said second buffer circuit; and a third circuit portion connected between the electrical load side of said set of contacts and said one end of said winding, said third circuit portion including a current limiting resistor.

4,027,209

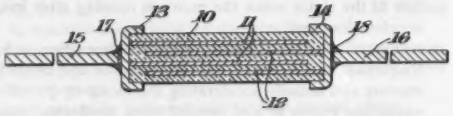
CERAMIC CAPACITOR HAVING A SILVER DOPED DIELECTRIC OF $(PB,LA)(ZR,TI)O_3$ AND GLASS

Galeb H. Maher, North Adams, Mass., assignor to Sprague Electric Company, North Adams, Mass.

Filed Oct. 2, 1975, Ser. No. 619,089

Int. Cl.² H01G 4/12

U.S. Cl. 361—361 **26 Claims**



1. A ceramic capacitor comprising a glass ceramic dielectric body and two spaced electrodes in contact with said dielectric body, said body consisting essentially of a major proportion of a calcined high temperature ceramic and a minor proportion of a low temperature glass, said high temperature ceramic consisting essentially of a lead zirconate wherein from 0.07 to 0.16 molar parts of said lead are replaced with lanthanum and wherein from 0.10 to 0.40 molar parts of said zirconate are replaced by titanate, said high temperature ceramic being doped with from 0.1 to 1.0 weight percent silver.

4,027,210

METHOD AND CONTROL SYSTEM TO LIMIT SHIFTING MOVEMENT OF A WINNING TOOL FOR A TUNNELING MACHINE

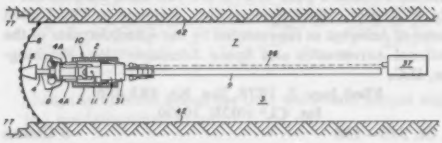
Karl-Heinz Weber, Witten-Heven, Germany, assignor to Gebr. Eickhoff, Maschinenfabrik und Eisengiesserei m.b.H., Germany

Filed Apr. 2, 1975, Ser. No. 564,366

Claims priority, application Germany, Apr. 8, 1974, 2416947

Int. Cl.² G05B 17/02

U.S. Cl. 318—16 **30 Claims**



1. A method for limiting shifting movement of a winning tool carried for universal movement on a tunneling machine employed to form a tunnel having a desired cross section, said method including the steps of determining the position of said winning tool relative to the tunneling machine by generating tool position coordinate signals in relation to a laser beam projecting along the tunnel toward the tunneling machine, forming a set of tool coordinate values from a pattern, template or the like which defines a shape that is geometrically similar to the desired cross section of the tunnel, said set of tool coordinate values defining limits to the universal movement by said winning tool for movement thereof within the desired tunnel cross section, generating signals to correct the coordinate values of said set of tool coordinate values in response to a position deviation by said tunneling machine from its position when said tool position coordinate signals were formed.

4,027,211

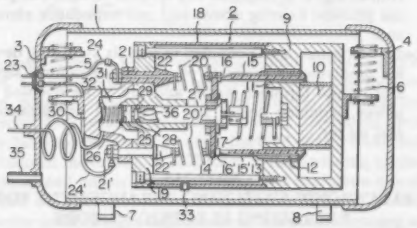
ELECTRICAL VIBRATION TYPE COMPRESSOR

Morikazu Omura; Yukio Okuda, and Hiroyuki Kainuma, all of Tokyo, Japan, assignors to Sawafuji Electric Company, Ltd., Tokyo, Japan

Filed Apr. 1, 1975, Ser. No. 564,135

Int. Cl.² H02K 33/18

U.S. Cl. 318—127 **28 Claims**



1. An electrical vibration type compressor comprising a single drive coil supported in a mechanical vibration system and capable of vibrating under a free stroke mode therein, a piston driven by said drive coil and vibrating resonantly with the natural frequency of the mechanical vibrating system, at least one main semiconductor element with a control electrode for controlling the switching so as to apply alternating drive current to said single drive coil, and a detecting means consisting of at least one detecting semiconductor element with a control electrode for detecting the vibration of the drive coil and controlling the conduction and turn off of the main semiconductor element in response thereto, and at least one time constant circuit interconnected between said detect-

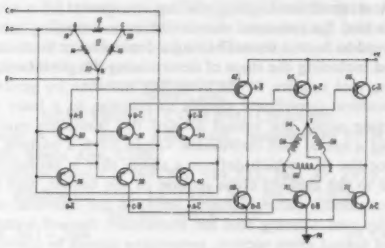
ing semiconductor element and said main semiconductor element; wherein the conduction and turn off of the main semiconductor element is performed at a maximum point of current and a minimum point of counter electromotive force of the drive coil, corresponding to the top and bottom dead centers of the piston which operates with said vibration under the free stroke mode, such that an electrical vibration system, including the main semiconductor element and the detecting means, is driven in synchronization with the vibration of the mechanical vibration system.

4,027,212

THREE PHASE FULL WAVE DC MOTOR DECODER

Philip A. Studer, Silver Spring, Md., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed June 3, 1975, Ser. No. 583,486
Int. Cl.² H02K *29/00*
U.S. Cl. 318—138 **8 Claims**



1. A decoding circuit for providing six properly phased control signals for a three phase DC motor having three angular position sensors comprising:

an impedance circuit having three separate impedance elements coupled together in a delta configuration, each point of said delta configuration adapted to be coupled to one of said angular position sensors of said motor,

switching circuit means including six electronic switching devices coupled to said impedance circuit such that each electronic switching device is coupled across one of said separate impedance elements for providing an output control signal in response to a specific direction of potential gradient existing across said one impedance element; and,

output terminal means coupled to said six switching devices for supplying six properly phased motor control signals, said output terminal means adapted to be coupled to a power switching bridge for controlling energization of said motor.

4,027,213

ELECTRONIC SWITCHING ARRANGEMENT FOR ENERGIZING ELECTRIC MOTORS

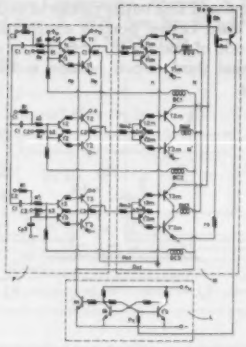
Pierre Albert Marie de Valroger, 15 rue de Presles, 75015 Paris, France

Filed Mar. 18, 1975, Ser. No. 559,553
Claims priority, application France, Mar. 28, 1974, 74.10824; Feb. 27, 1975, 75.06118
Int. Cl.² H02K *29/00*
U.S. Cl. 318—138 **29 Claims**

1. An electronic switching arrangement for feeding from a direct-current source an electric motor having a stator with a polyphase winding, and a rotor equipped with means thereon for maintaining a permanent magnetic field, said motor also having means for sensing angular position and speed of said rotor and for generating electric signals representative of said position and speed and distributing signals so generated in turn to a number of outputs equal to the number of phases of said stator winding, said arrangement comprising:

means for producing, in response to said signals generated by said sensing means, a set of three-level stepped control waves of a period equal to one revolution of said motor and of respective phases mutually displaced by the same angular separation as the phases of said stator winding, each three-level wave being supplied at a separate output which at one of the three levels is a positive voltage, at another of said levels is zero voltage and at the other of said levels is a negative voltage, with the zero voltage level portions of said wave having the duration of the interval between two successive signals of said sensing means and being equally spaced in phase, and the portions of each said wave following any two successive zero level portions thereof being of different voltage polarity;

semiconductor power switching means responsive to each stepped wave output of said wave producing means and providing switching paths for the respective phases of said stator winding, providing to said respective phases of said winding a positive, zero or negative applied voltage at a terminal connection thereof corresponding to the level of the stepped wave at the input of said power switching



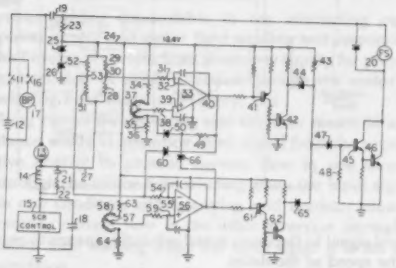
means for the phase, whereby a system of polyphase bi-directional currents in alternating shaped waves of at least three levels of magnitude in each direction in addition to a zero level step, and approximately sinusoidal in form, is produced in the winding of said stator, having a frequency and phase angle respectively determined by the speed of the rotor of the motor and its position relative to the stator when the motor is running after initial acceleration, and

a sequential excitation circuit means for operation at low frequency independently of the speed of the rotor for starting and initially accelerating the motor by providing excitation pulses to said control wave producing means when power is applied to said electronic switching arrangement and to said motor, said sequential excitation circuit being subject to being overridden by the signals produced by said sensing means at motor speeds above a threshold speed and to becoming incapable of effecting said wave producing means at motor speeds above said threshold speeds, the outputs of said sequential excitation circuit means being supplied to the same inputs of said control wave producing means to which said signals generated by said sensing means are supplied.

4,027,214
FIELD SHUNTING CIRCUIT

Robert G. Klimo, Parma, Ohio, assignor to Cleveland Machine Controls, Inc., Cleveland, Ohio

Filed Oct. 28, 1975, Ser. No. 626,673
Int. Cl.² H02P 5/16
U.S. Cl. 318—139 10 Claims



1. In a field shunting circuit for a d.c. motor having an armature and a field winding connected to a direct current source, and a field shunt resistor, the improvement comprising:

a. first and second voltage comparators each having first and second inputs and an output which is high when the first input is lower than the second input and is low when the first input is higher than the second input,

b. means for applying reference voltages to the second inputs of both of said comparators, the reference voltage to said first comparator being lower than that to said second comparator,

c. means for applying signal voltages proportional to the armature current to the first input of both of said comparators,

d. means for connecting said field shunt resistor across said field winding when, and only when, the outputs of both comparators are high,

e. a feedback loop for applying a high output of said first comparator to the second input of said first comparator,

f. means for applying a low output of said first comparator to the first input of said second comparator,

g. means for disabling said feedback loop of said first comparator when the output of said second comparator is low.

4,027,215
ROTARY MACHINE

John H. Knight, Kettering, and Milton S. Isaacson, Dayton, both of Ohio, assignors to Xerox Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 484,563, July 1, 1974, abandoned. This application Mar. 24, 1975, Ser. No. 561,537
Int. Cl.² H02P 5/16
U.S. Cl. 318—341 35 Claims

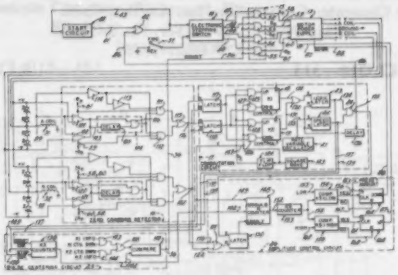
1. A machine comprising, in combination:

a stator with a plurality of windings thereon, each said stator winding producing a flux when electrical current flows therethrough;

a rotor rotatably mounted with respect to said stator;

means for producing a magnetic field in said rotor which is fixedly oriented with respect to said rotor, said field interacting with said flux to produce a rotational torque force on said rotor when the physical positioning of said rotor with respect to conducting stator windings is such that the torque angle is greater than 0°, said magnetic field of said rotor being operative to induce electrical voltage in said stator windings when said rotor is rotatng;

power signal generating means responsive to said induced voltage in said stator windings to apply power signals to said stator windings in a predetermined sequence at a frequency no greater than a predetermined selectable frequency, said power signals being generated at times

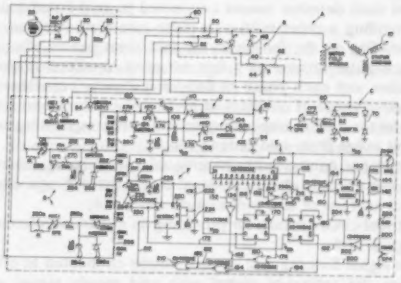


always symmetric about the time when said torque angle is a predetermined value.

4,027,216
CONTROL DEVICE FOR A SYNCHRONOUS MOTOR

Ivan E. Rozek, Cleveland Heights, Ohio, assignor to Portec, Inc., Cleveland, Ohio

Filed Aug. 1, 1975, Ser. No. 601,078
Int. Cl.² H02P 1/46
U.S. Cl. 318—176 24 Claims

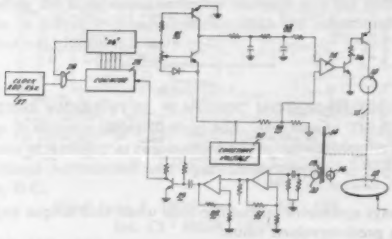


1. A control device for a synchronous motor having a stator, a rotor, a field-winding discharge circuit with a slip induced current generally alternating between positive and negative half cycles and having a frequency directly dependent upon the slip between the rotating energizing field of said stator and the rotational movement of said rotor, a field-winding excitation circuit and means for deactivating said excitation circuit when said slip induced current flows in said discharge circuit, said device comprising: a digital counter means for creating an output signal when said counter means has counted a selected number of pulses during a counting interval; means for creating counting pulses having a set frequency; directing means for directing said counting pulses to said counter means; resetting means responsive to one of said half cycles for resetting said counter, whereby said resetting means terminates a counting interval of said counter means; means responsive to a lack of said one half cycle to allow said counter means to count toward said selected number; control means responsive to said output signal for activating said excitation circuit, means for creating a control signal when said counter means counts beyond said selected number to a higher number of means responsive to said control signal for activating said excitation circuit.

4,027,217
SPEED CONTROL FOR A MOTOR

Jefferson H. Harman, Thousand Oaks, Calif., assignor to Pertec Computer Corporation, Los Angeles, Calif.

Filed Feb. 12, 1975, Ser. No. 549,333
Int. Cl.² H02P 5/06
U.S. Cl. 318—313 **9 Claims**



1. Speed control apparatus for a motor, preferably a low inertia motor with high speed response as to any speed changes, comprising:

a disk coupled to the motor and rotating therewith and having a plurality of annularly arranged detectable markings;

detector means disposed in relation to said disk for scanning the markings and providing a train of reset pulses having pulse rate frequency considerably larger than the rotational frequency of the disk;

a counter connected to count clock pulses having a frequency considerably higher than the frequency of said reset pulses, the counter being connected to be reset by said pulses, to begin counting again following each resetting;

count state detector means connected to said counter and providing a pulse train at a pulse rate frequency corresponding to the frequency of said reset pulses wherein each pulse represents a first range of numbers of clock pulses and each pause as following a pulse represents a second range of numbers of clock pulses, the count state detector means responding to a number separating said first range from said second range;

filter means connected to receive said pulse train and providing a steady electrical signal that is the d.c. equivalent and average of said pulse-pause sequence;

electrical circuit means for providing an electrical reference signal; and

error signal forming and control means connected to compare the reference signal with said steady signal and controlling the motor in response to said comparing.

4,027,218
ELECTRONIC CONTROLS

Alan Polkinghorne, and Raymond Frank Wood, both of Cockermouth, England, assignors to Doublefell Limited, Workington, England

Filed Dec. 2, 1974, Ser. No. 528,660
Claims priority, application United Kingdom, Dec. 1, 1973, 55774/73
Int. Cl.² H02P 5/00
U.S. Cl. 318—327 **2 Claims**

1. An electronic control for a laundry washing machine comprising:

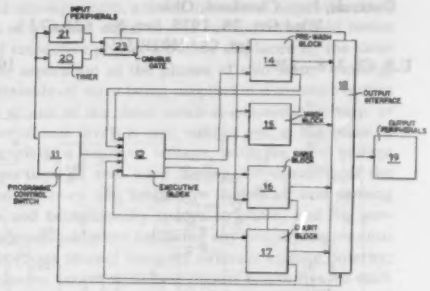
drum speed regulating means;

drum speed sensing means arranged to give a first electrical signal directly proportional to the drum speed;

means for establishing any one of a plurality of different second electrical signals corresponding to the drum speed required;

means for integrating the difference between the first and second signals to produce a third electrical signal;

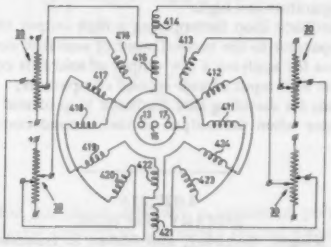
means for mixing the third electrical signal with a signal whose magnitude depends directly on the drum speed to produce a control signal, and means for feeding the control signal to the drum speed regulating means to regulate the speed of the drum.



4,027,219
DEVICE FOR DISPLAYING COLOR TELEVISION IMAGES

Willem Meijndert Van Alphen; Piet Gerard Joseph Barten; Johannes Van Den Boogert; Joris Adelbert Maria Nieuwendijk; Jan Gerritsen, and Adrianus Hubertus Kantelberg, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 5, 1975, Ser. No. 628,908
Claims priority, application Netherlands, Nov. 14, 1974, 7414845
Int. Cl.² H01J 29/70, 29/76
U.S. Cl. 315—368 **11 Claims**



1. A correction circuit for a display tube having a neck portion means for generating three coplanar electron beams, said circuit comprising at least eight static convergence correction coils adapted to be disposed about said neck portion with coplanar axises, and means for adjusting the displacement of the two outer beams in any direction with respect to the center beam and for applying direct current variable in amplitude and polarity to said coils, whereby at least eight variable strength magnetic poles are obtained distributed about the neck in one plane.

4,027,220
REGENERATIVE MOTOR CONTROL HAVING IMPROVED FIELD CIRCUIT

Alan W. Wilkerson, Thiensville, Wis., assignor to Allen-Bradley Company, Milwaukee, Wis.

Filed May 5, 1975, Ser. No. 574,550
Int. Cl.² H02P 3/14
U.S. Cl. 318—376 **7 Claims**

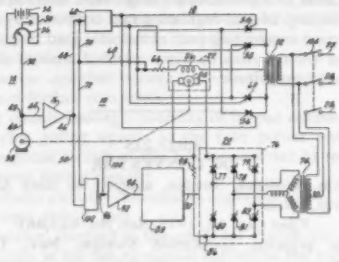
1. In a static regenerative direct current motor control

which obtains regeneration of power from a motor operatively associated with the regenerative control to an alternating current power supply by reversing the motor field winding current, a motor field winding circuit means for providing current energization to the motor field winding and for reversing, through zero energization, the direction of current flow through the motor field winding, said field circuit means including:

thyristor means connectable to the alternating current power supply and motor field winding and responsive to half cycles of current from the power supply for providing current flow in either direction through the motor field winding from the power supply; and

a firing circuit for operating said thyristor means in accordance with a bi-condition input signal from the regenerative control to provide current flow in one direction through the motor field winding when the input signal is in one condition and operating said thyristor means to provide current flow in the other direction through the motor field winding when the input signal is in the other condition,

said firing circuit including a pair of pulse generators coupled to said thyristor means and responsive to the bi-conditional input signal from the regenerative control for energizing one of said pulse generators to provide current flow in one direction through the motor field winding when the input signal is in one condition and energizing



the other of said pulse generating means to provide current flow in the other direction through the motor field winding when the input signal is in the other condition, each of said pulse generators comprising

a pulse generating means having an output coupled to said thyristor means, said pulse generating means including means for synchronizing the operative state of said pulse generating means with the half cycles of alternating current applied to said thyristor means, said pulse generating means being energizable by a control signal when in the operative state for generating a firing pulse at said output at a point in the conductive half cycle of alternating current determined by the magnitude of the control signal; and

control means coupled to said pulse generating means and including bias means for establishing a control signal to said pulse generating means having a minimal magnitude sufficient to energize said pulse generating means to generate a firing pulse in the terminal portion of each half cycle, said control means having an input receiving the input signal from the regenerative control for increasing the magnitude of the control signal beyond that provided by said bias means to advance the energization of the pulse generating means and the generation of the firing pulse in each conductive half cycle to provide current through the field winding in accordance with the input signal.

4,027,221

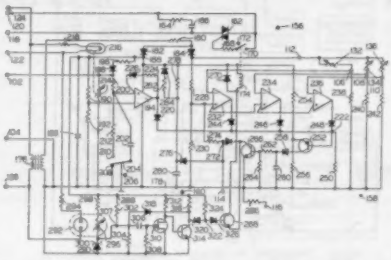
CONTROL CIRCUIT WITH TIME DELAY

Dennis E. Newell, El Segundo, Calif., assignor to Robertshaw Controls Company, Richmond, Va.

Filed Feb. 11, 1975, Ser. No. 549,125

Int. Cl.² H02H 7/085

U.S. Cl. 318—484 **11 Claims**



1. A control circuit to prevent reenergization of a load for a predetermined time comprising

means including a first semiconductor switching device for controlling energization of the load,

a second semiconductor switching device having conductive and non-conductive states and connected to control said first switching device to deenergize the load when said second switching device is conductive,

a field effect transistor connected to control the operation of said second switching device,

a circuit junction,

a capacitor having a first side connected to the gate of said field effect transistor and a second side connected to the circuit junction,

a resistance connected across said capacitor,

condition responsive means connected to the circuit junction for lowering the voltage at the circuit junction to turn off said field effect transistor, and

a diode having its anode connected to the circuit junction and its cathode connected to said second switching device for holding the voltage at the circuit junction at a low voltage until the voltage on the first side of said capacitor is raised sufficiently to turn on said field effect transistor.

4,027,222

MANUAL CONTROL IN A MOTION CONTROL SYSTEM

Albert C. Leenhouts, Harwinton, Conn., assignor to The Superior Electric Company, Bristol, Conn.

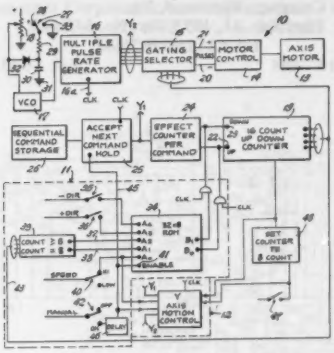
Filed July 14, 1975, Ser. No. 595,534

Int. Cl.² G05B 7/00

U.S. Cl. 318—591 **15 Claims**

1. A manual control system for a digital motion system of the type having successive time intervals with a whole number of pulses being supplied in a time interval and with each pulse producing a digital movement comprising means for supplying pulses at a progressively increasing number of pulses per time interval, operable means for exclusively directing manual control of the digital motion, means for sensing the number of pulses in the initial time interval after operation of the operable means, actuatable means which upon actuation commands a number of pulses per time interval, means for changing the number of pulses in subsequent time intervals from the initial number to the commanded number of pulses in accordance with the progression of the numbers in the means for supply-

ing with each different number in the progression appearing in a different time interval and in which the actuatable means



normally commands a zero number of pulses in a time interval in the absence of actuation.

4,027,223

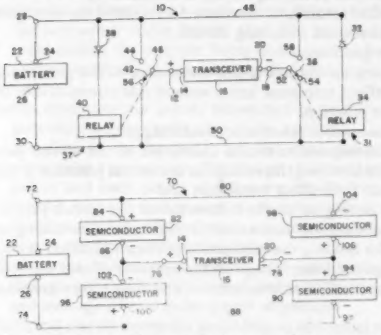
TRANSCEIVER POLARITY PROTECTOR

Frank G. Renz, 29 Duo Drive, Lancaster, Pa. 17603

Filed July 6, 1976, Ser. No. 702,433

Int. Cl.² H01H *83/08;* **H02J** *7/00*

U.S. Cl. 320—26 **2 Claims**



1. An apparatus for protecting a mobile transceiver from the application of reversed polarity battery power comprising:

a first input terminal means;

a first power buss means electrically connected to the first input terminal means;

a second input terminal means;

a second power buss means electrically connected to the second input terminal means;

a first polarity sensing control means electrically connected to both the first power buss means and the second power buss means whereby said first polarity sensing control means is subjected to the voltage between the first power buss means and the second power buss means;

a second polarity sensing control means electrically connected to both the first power buss means and the second power buss means, with its polarity of activation reversed from the polarity of activation of the first polarity sensing control means, whereby said second polarity sensing control means is also subjected to the voltage between the first power buss means and the second power buss means;

a positive output terminal means;

a negative output terminal means;

a first contact means, connected to and activated by the first polarity sensing control means, when not activated connecting the positive output terminal means to the second power buss means, and, when activated, connecting the positive output terminal means to the first power buss means; and

a second contact means, connected to and activated by the second polarity sensing control means, when not activated connecting the negative output terminal means to the second power buss means, and, when activated, connecting the negative output terminal to the first power buss means.

4,027,224

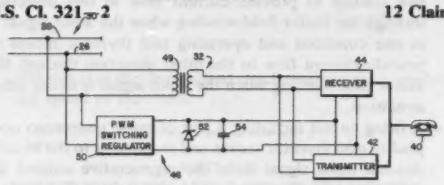
POST-REGULATED SWITCHING REGULATOR CIRCUIT

Gerald W. Beene, Arlington, Tex., assignor to Reliance Telecommunication Electronics Company, Euless, Tex.

Filed Oct. 24, 1973, Ser. No. 409,093

Int. Cl.² G05F *3/14*

U.S. Cl. 321—2 **12 Claims**



1. A method of regulating voltage with a voltage regulating circuit in which a PWM switching regulating d.c.-to-d.c. converter is normally effective to limit the regulated voltage across a load to a pre-selected magnitude, said method comprising the step of post-regulating said converter by establishing a current-conducting path across said load only when said regulated voltage rises by a pre-selected amount above said pre-selected magnitude.

4,027,225

DC CONVERTOR

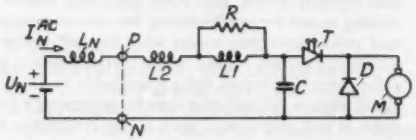
Sten Elvin, Vasteras, Sweden, assignor to Asea Aktiebolag, Vasteras, Sweden

Filed Oct. 17, 1975, Ser. No. 623,461

Claims priority, application Sweden, Nov. 18, 1974, 7414425

Int. Cl.² H02M *1/14*

U.S. Cl. 321—10 **3 Claims**



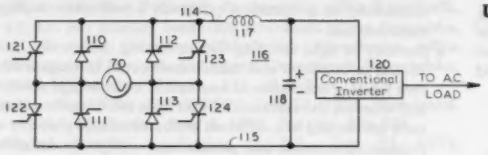
1. A DC convertor for supplying a load with direct voltage pulses with a variable frequency, said convertor having input terminals for connection to a DC supply network and comprising a main circuit and a filter circuit connected between said input terminals and said main circuit, said filter circuit comprising a capacitive parallel branch and a first series inductor connected between an input terminal and said capacitive parallel branch, a resistor for reduction of the Q-value of the filter circuit connected in parallel with said first series inductor; and said first series inductor being saturated at a value of the convertor load current which is lower than the rated load current.

4,027,226

BIPOLAR INVERTER WITH INDUCTION GENERATOR

George Henry Studtmann, Mount Prospect, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed June 27, 1975, Ser. No. 590,883
Int. Cl.² H02M 7/757, 5/297
U.S. Cl. 321—47 12 Claims



10. A modulated induction generator system for providing a multi-phase a-c output voltage for energizing a load, in which each phase circuit comprises:

an induction machine, having an input shaft for receiving mechanical input energy and a pair of output connections,

a bipolar inverter, including a first leg having a pair of power switches coupled in series between a first pair of bus conductors, with the common connection between the first pair of power switches being coupled to one output connection of the induction machine, and a second leg including a second pair of power switches coupled in series between the bus conductors, with the common connection between the second pair of power switches being coupled to the other output connection of the induction machine, and

a capacitor coupled between the bus conductors; which system further comprises

a logic circuit, having a plurality of output connections for applying gating signals to the four power switches in each phase circuit of the bipolar inverter in response o received timing signals;

an oscillator circuit connected to apply the timing signals to the logic circuit; and

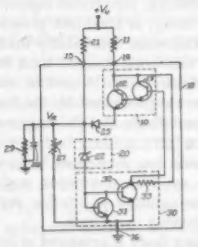
a modulator, coupled to the oscillator circuit, for effecting variation in the timing signals applied to the logic circuit form the oscillator.

4,027,227

COMBINATION VOLTAGE REGULATING SYSTEM

Christopher M. Engel, Franklin Park, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.

Filed Jan. 4, 1974, Ser. No. 430,801
Int. Cl.² G05F 1/48
U.S. Cl. 323—8 10 Claims



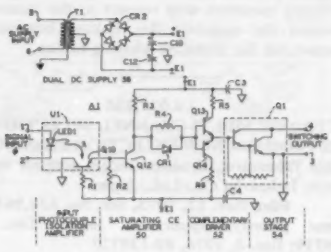
1. A regulating system, especially adapted for integrated circuits, having a maximum regulator power dissipation over its regulating range which is less than that of either a shunt or series type regulator, for supplying power at a regulated voltage to a load circuit from an unregulated voltage source comprising voltage regulating means characterized by a regulator power dissipation curve, over its regulating range, having at least two minima and two maxima.

4,027,228

PHOTOCOUPLED ISOLATED SWITCHING AMPLIFIER CIRCUIT

James R. Collins, Fort Wayne, Ind., assignor to General Electric Company, Carmel, Ind.

Division of Ser. No. 568,237, April 15, 1975, Pat. No. 3,976,932. This application Mar. 23, 1976, Ser. No. 669,380
Int. Cl.² G05F 1/64
U.S. Cl. 323—21 8 Claims



1. A switching amplifier circuit for the electrically isolated coupling of an imput logic circuit with a load, comprising: a light-emitting diode- phototransistor isolation pair wherein

the phototransistor collector circuit is connected in a low impedance circuit to provide current limiting by the intrinsic current transfer ratio of the isolation pair to enhance switching speed;

an output power transistor for controlling output power to the load;

a current amplifying and level-shifting means connected between the output of the isolation pair and the output power transistor for providing forward and reverse base drive thereto; and

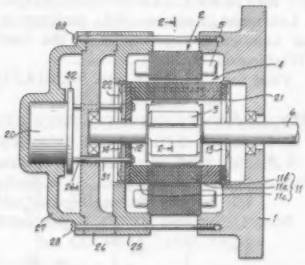
a line - operated D. C. power supply connected to the current amplifying and level-shifting means for providing operation power thereto.

4,027,229

REGULATABLE PERMANENT MAGNET ALTERNATOR

Richard C. Frink, Norwich, N.Y., assignor to Simmonds Precision, Engine Systems, Inc., Norwich, N.Y.

Filed Dec. 15, 1975, Ser. No. 640,768
Int. Cl.² H02K 21/14
U.S. Cl. 322—50 10 Claims



1. A regulatable permanent magnet alternator, including:

a. a stator member having at least one pair of poles;

b. a rotor member having at least one pair of poles;

c. permanent magnet field means on one of said members;

d. armature winding means on the other of said members;

e. a hollow cylindrical sleeve coaxial with the rotor member and extending between the stator member and rotor member, said sleeve comprising:

1. a plurality of peripherally spaced bridging members, each bridging member including a stack of laminations of ferromagnetic material, said bridging members being equal in number to the number of stator poles;
2. two end plate means, one at each end of said sleeve;
3. a plurality of fastening means, each including a rod extending through one of the bridging members and both end plate means; and

f. means operatively connected to the sleeve for shifting the angular position thereof to change the alignment of the bridging members with respect to the stator poles, and thereby the magnetic flux linkage between the field means and the armature winding means.

4,027,230

ELECTRONIC MULTI-CHANNEL SELECTION SWITCH WITH COMMON NEW-SELECTION SENSING DEVICE

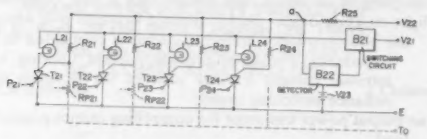
Takehide Takemura, Hirakata, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Japan

Filed Nov. 12, 1975, Ser. No. 630,961

Claims priority, application Japan, Dec. 4, 1974, 49-139719; Dec. 4, 1974, 49-139723

Int. Cl.² G05F *1/10*

U.S. Cl. 323—79 **35 Claims**



1. An electronic switch comprising

a. a plurality of thyristors each with the P- and N-gates, which are connected in parallel and whose cathodes are connected in common,

b. switching means connected to the anode circuits of said thyristors,

c. detector means whose input is connected to the N-gate circuits of said thyristors and whose output is connected to said switching means for operating said switching means to block said thyristor anode circuits in response to the conduction of more than one of said thyristors, and

d. a plurality of input terminals each connected to the P-gate of each thyristor.

4,027,231

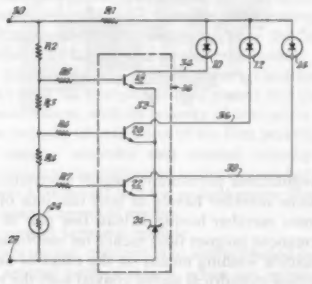
BATTERY CHARGE INDICATOR

Dieter R. Lohrmann, Lanham, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sept. 17, 1975, Ser. No. 614,715

Int. Cl.² G01N *27/42*

U.S. Cl. 324—29.5 **3 Claims**



1. A battery life indicator comprising:

a battery having a known battery voltage versus battery life characteristic;

a voltage divider permanently connected to said battery including a plurality of preselected resistors and at least one thermistor;

a plurality of transistors the bases of which are connected through preselected base resistors to different points on said voltage divider, and the emitters of which are all connected to a common point on a reference voltage element; and

a plurality of light emitting diodes having the anodes connected in common and thence connected through a current limiting resistance to one end of said voltage divider, and wherein the cathodes of said light emitting diodes are each connected to a different collector of said plurality of transistors, wherein said preselected voltage divider resistors, said voltage divider points, said base resistors, said thermistor, said voltage reference element, and said current limiting resistor are selected in accordance with said battery voltage versus battery life characteristic in order that the number of lighted light emitting diodes indicates a predetermined battery life remaining.

4,027,232

DEVICE FOR MONITORING THE TRAVEL OF A YARN LIKE STRUCTURE UTILIZING THE FRICTIONAL ELECTRICITY INVOLVED WITH SAID TRAVEL

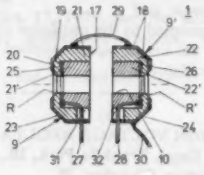
Rene Domig, Kusnacht, and Erich Weidmann, Kleinandelfingen, both of Switzerland, assignors to Aktiengesellschaft Gebrüder Loepfe, Wetzikon, Switzerland

Filed Nov. 14, 1975, Ser. No. 632,104

Claims priority, application Switzerland, Nov. 29, 1974, 15854/74

Int. Cl.² G01R *29/12*; G01N *27/60*; D01H *13/22*

U.S. Cl. 324—32 **8 Claims**



1. A device for monitoring the travel of a yarn-like structure by generating an electric yarn travel signal, comprising at least one yarn guiding body, at least one ground electrode and at least one signal electrode electrically insulated from said at least one ground electrode, said at least one signal electrode producing said electric yarn travel in response to electric charge displacements generated by the traveling yarn at the region of said signal electrode, the improvement comprising:

said at least one yarn guiding body, ground electrode and signal electrode are shaped as hollow structures having substantially cylindrical interior surfaces and arranged such that the cylindrical interior surfaces form a yarn passageway having open ends;

each yarn guiding body is arranged at one of the open ends of said passageway and has a yarn friction zone adjoining the one open end;

each signal electrode is arranged in direct contact with a yarn guiding body and adjacent to said friction zone for generating a yarn travel signal; and

said ground electrode cooperating with said signal electrode to provide a given reference potential for said signal electrode.

4,027,233

CONTACTLESS INDUCTANCE PICKUP FOR DETECTING THE INTERFACE OF TWO MEDIA

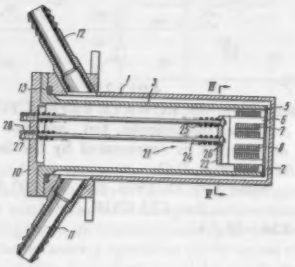
Eduard Ivanovich Shmakov, ulitsa Engelsa, 19, kv. 18; Boris Izrailevich Medovar, ulitsa A. Barbjusa, 22/26, kv. 109; Anatoly Ivanovich Chvertko, bulvar Lesi Ukrainki, 2, kv. 739; Vladimir Vasilievich Koval, ulitsa P. Tychiny, 1, kv. 298; Vyacheslav Georgievich Fedotenkov, ulitsa Kreschatik, 29, kv. 45; Oleg Petrovich Bondarenko, ulitsa Kreschatik, 15, kv. 34; Anatoly Iosifovich Kravchuk, ulitsa Semashko, 10, kv. 54; Alexandr Mikhailovich Marchenko, ulitsa Stroitelei, 17, kv. 18, and Alexei Georgievich Bogachenko, ulitsa Miljutenko, 15/2, kv. 141, all of Kiev, U.S.S.R.

Continuation of Ser. No. 490,993, July 23, 1974, abandoned. This application June 9, 1975, Ser. No. 584,928

Claims priority, application U.S.S.R., July 23, 1973, 1947940

Int. Cl.² G01R *33/12*

U.S. Cl. 324—34 R 12 Claims



1. A contactless inductance interface pickup for detecting the interface of two media differing in specific density and resistivity of which at least one is electrically conductive and non-magnetic, comprising: a first housing having a bottom and a cover; a second housing formed as a pot and having a bottom constructed from a non-magnetic material, the second housing being rigidly secured within the first housing to the cover of the first housing; a clearance defined by the first and second housings; means for supplying a cooling agent into the clearance; means for draining the cooling agent from the clearance; a magnetic circuit installed inside the second housing in immediate proximity to the bottom thereof and secured to the cover of the first housing; at least one measuring winding and at least one energized winding disposed on the magnetic circuit; the bottom of the second housing being of such a thickness as to allow the magnetic field of the pickup to reach the interface of the two media; and a mechanism for displacing the magnetic circuit relative to the bottom of the second housing, the mechanism being mechanically linked with the magnetic circuit and comprising: a non-magnetic plate rigidly secured on the magnetic circuit; three rods mechanically linked with the plate; a spring disposed on each of the rods and serving to actuate the plate; one end of each of the rods being movably mounted in the cover of the first housing; the other end of each of the rods being formed as a spherical bearing; apertures formed in the plate, the number of the apertures corresponding to the number of the rods, the apertures serving to accommodate the spherical bearings; one of the apertures disposed on the longitudinal axis of the second housing; the other two of the apertures so disposed as to lie in two planes, one parallel and one perpendicular to the plane of the magnetic circuit, and passing through each of the two apertures and the aperture disposed on the longitudinal axis of the second housing.

4,027,234

DEVICE FOR MEASURING TERRESTRIAL MAGNETIC FIELD HORIZONTAL COMPONENTS AND VARIATIONS THEREOF

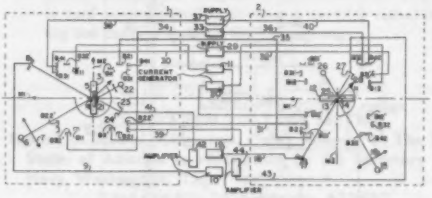
Jean Paul Mosnier, Massy, France, assignor to Etat Francais, France

Filed Apr. 21, 1975, Ser. No. 569,849

Claims priority, application France, May 6, 1974, 74.15502

Int. Cl.² G01R *33/02*

U.S. Cl. 324—48 7 Claims



1. A device for the measurement of terrestrial magnetic field horizontal components and variations thereof, said device comprising:

first and second variometers including slave magnets controlled by feedback compensation fields, the directional fields of said magnets being oriented in first and second directions that define a constant angle therebetween;

first and second generating means for generating first and second primary compensation fields in said first and second variometers, respectively, said first and second primary compensation fields compensating the horizontal component of the terrestrial magnetic field normal to the direction of the directional field of the variometer associated therewith;

first and second measuring means for measuring the electrical currents required to create respective ones of said first and second primary compensation fields;

means for generating feedback compensation fields for said first and second variometers, after the first and second primary compensation fields have been established, said feedback fields compensating for variations in the terrestrial field components;

means for computing the magnitude of the horizontal component of the terrestrial magnetic field and the direction thereof with reference to said device, as a function of the outputs of said first and second measuring means and as a function of said constant angle; and

means for computing the variations in said components from the feedback compensation fields.

4,027,235

DIRECT CURRENT COMPENSATION CIRCUIT WITH CURRENT THRESHOLD DETECTION

Max S. Macrander, Warrenville, and Ronald F. Kowalik, Lombard, both of Ill., assignors to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Aug. 13, 1976, Ser. No. 714,438

Int. Cl.² H01F *13/00*, *19/02*

U.S. Cl. 323—48 8 Claims

1. A circuit for monitoring direct current flow from a source into a first winding of a transformer and for supplying a corresponding compensation current to a second winding of the transformer, comprising:

first resistance means connected between said source and said first winding;

a common terminal;

first transistor means having first, second and third terminals,

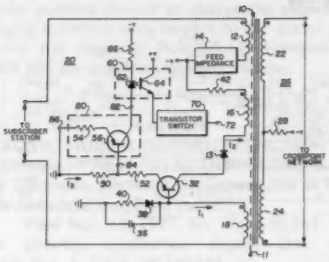
said first terminal being connected to said first winding;

second resistance means connected between said source and said common terminal;

third resistance means connected between said common terminal and said third terminal;

circuit means connecting said second terminal to said second winding;

a fourth resistance means connected to said source; current responsive means; and



a second transistor means having a fourth, fifth and sixth terminal, with said fourth terminal connected to said common terminal,

said fifth terminal connected to said current responsive means, and a said sixth terminal connected to said fourth resistance means.

4,027,236

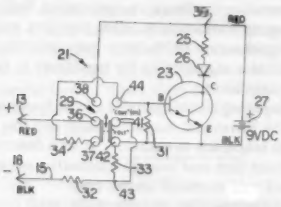
VOLTAGE AND CONTINUITY CHECKER

Phillip M. Stewart, Portage, Mich., assignor to Triple S Products Company, Vicksburg, Mich.

Filed July 14, 1976, Ser. No. 705,270

Int. Cl.² G01R *31/02, 19/16*

U.S. Cl. 324—51 **6 Claims**



5. A portable instrument for checking electrical continuity, voltage and polarity, comprising in combination:

electronic switch means having a control electrode and main current electrodes controlled thereby;

current limiting means in series with said main electrodes and an LED serially interposed between said current limiting means and said electronic switch means and poled for conduction in series with the latter to provide a visible test indication;

portable electrical supply means connected across the series current limiting means, LED and main electrodes so as to provide operating current for said LED in both voltage and continuity test modes of the instrument upon conduction of said electronic switch means;

first and second test probes and a first resistance in series with said second test probe;

switch means actuable to a voltage test position in which said seocnd test probe connects through said first resistance to a point between said electrical supply and the adjacent one of said main electrodes and including means connecting said first test probe to said control electrode, said switch means being actuable to a continuity test position and including means in such continuity test position connecting said second test probe through said first resistance to said control electrode and connecting said first test probe conductively to the junction point of said electrical supply and current limiting means;

whereby said electrical supply can actuate said control electrode by conduction through a conductive test member contacted by said probes and said first resistance so as to cause indicating current flow through said main electrodes and indicating means, but wherein a voltage source if erroneously connected across said test probes with said switch means in said continuity position can supply only a limited magnitude of current through said LED, to the extent permitted by said current limiting means and first resistance.

4,027,237

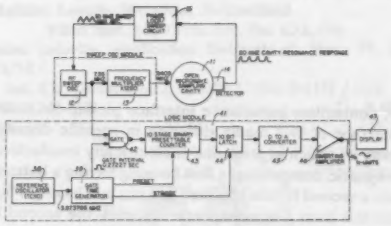
AIRBORNE MICROWAVE REFRACTOMETER

William A. Heile, Indianapolis, Ind., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 22, 1976, Ser. No. 707,904

Int. Cl.² G01R *27/04*

U.S. Cl. 324—58.5 C **9 Claims**



1. An airborne microwave refractometer for determining the refractive index of air and providing an output of refractivity in N-units comprising,

an open sampling cavity having an input and an output,

sweep oscillator means for generating radio frequencies over a range of frequencies coupled to said input of said open sampling cavity to acquire resonance when a specific frequency in said range of frequencies resonate with said cavity to produce a resonate signal at said output,

a detector coupled to said output of said sampling cavity for detecting said resonate signal,

feedback circuit means connected between said detector and said sweep oscillator for equalizing the center frequency of said sweep oscillator and the resonant frequency of said sampling cavity,

counter means having an input and an output for counting the frequency output of said sweep oscillator,

gating means connected between said sweep oscillator means and said input of said counter means for loading the output frequency of said sweep oscillator means into said counter means for a predetermined period of time, and

display means connected to the output of said counter means for displaying refractivity in N-units when said center frequency of said sweep oscillator and said resonance frequency are equal.

4,027,238
METHOD AND APPARATUS FOR THE MOISTURE MEASUREMENT OF FLAT STRUCTURES, ESPECIALLY TEXTILE WEBS

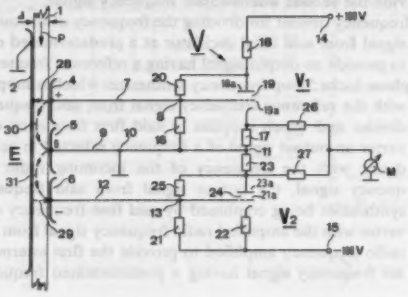
Ernst Loch, Uster, Switzerland, assignor to Zellweger Uster Ltd., Uster, Switzerland

Filed Aug. 16, 1976, Ser. No. 714,857

Claims priority, application Switzerland, Oct. 20, 1975, 13570/75

Int. Cl.² G01N 27/12

U.S. Cl. 324—65 R **11 Claims**



1. A method for measuring the moisture content of flat textile structures, especially textile webs, comprising the steps of: feeding a textile structure along a predetermined path of travel, carrying out a moisture measuring operation, deriving by virtue of the measuring operation useful signal components of the same polarity dependent upon the conductance of the test material, and disturbance signal components of opposed polarity dependent upon external voltages, adding the useful signal components to form a measurement value, and adding the disturbance signal components which by virtue of their opposed polarity at least approximately eliminate one another.

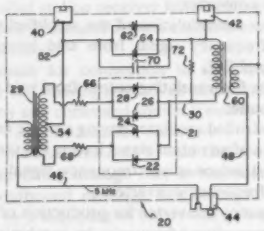
4,027,239
CURRENT LEVEL DETECTOR

Cordon R. Kerns, Wheaton, Ill., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Nov. 25, 1975, Ser. No. 635,016

Int. Cl.² G01R 19/18; H03C 1/54

U.S. Cl. 324—118 **7 Claims**



1. A device for detecting the current level of a DC signal, comprising:

reference signal means for developing an AC reference signal of particular frequency;

a balanced push-pull type input circuit coupled to said reference signal means and having said AC reference signal applied thereto, two front-to-back coupled diode pairs with said diode pairs coupled in series with each other and with said balanced input circuit, a first DC input connector coupled to said balanced input circuit, a second DC input connector, an output junction directly coupling the two diode pairs, output means coupled between the second DC input connector and the output junction, the DC current signal being applied as an offset so that with current level of the DC signal nonzero there is developed at the output junction an output signal composed of even harmonic frequencies of said particular frequency with the phase of said output determined by the polarity of said DC signal with the amplitude of said output proportional to the amplitude of said DC signal, and a demodulator coupled to said diode pairs responsive to said output signal to develop a monitor signal indicating the current level of the DC signal.

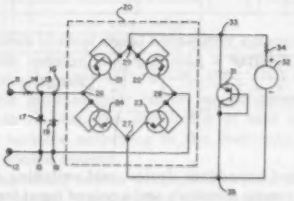
4,027,240
PROTECTED VOLTAGE METER

Robert C. Meade, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 20, 1975, Ser. No. 623,697

Int. Cl.² G01R 1/36, 19/22

U.S. Cl. 324—110 **2 Claims**



1. A device for measuring an A.C. or D.C. input signal regardless of polarity comprising:

input terminals;

a first limiter consisting of two diodes, each connected in parallel and in opposite directions of conductance across the input terminals for limiting amplitude of the input signal;

a full-wave bridge rectifier of diode-coupled transistors connected to said first limiter;

a second limiter receiving output from the rectifier for protecting a microammeter and consisting of a diode-coupled transistor connected in parallel with said microammeter;

a microammeter connected in parallel with the second limiter, said microammeter operating within current ranges defined by the first and second limiters whereby small currents are registered and large currents do not damage the microammeter; and

a source of low current test signal connected to said input terminals when testing said device but otherwise electrically insulated from the device.

4,027,241
SOLID STATE WATT AND VAR TRANSDUCER

Jeremy P. Jauch, Kearny, N.J., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

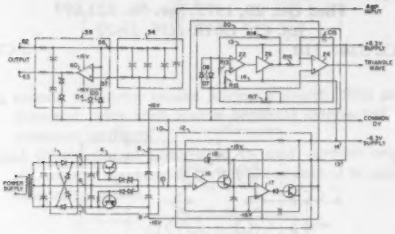
Filed May 19, 1976, Ser. No. 687,837

Int. Cl.² G01R 21/06

U.S. Cl. 324—142 **16 Claims**

1. A transducer comprising a first input means for energization with the voltage quantity component of the quantity to be measured, a second input means for energization with the current quantity component of the quantity to be measured, a plurality of operational amplifiers, each said amplifier having

a positive and a negative input terminal and an output terminal, a plurality of inverters, each said inverter having an output terminal and an input terminal and effective to provide first and second control quantities depending upon the relative magnitudes of an input quantity supplied to its said input terminal and the magnitude of a base quantity, an electronic switching device, a precision wave generator having an output circuit, said generator including a first and a second of said amplifiers and a first of said inverters, said output terminal of said first amplifier being connected to said input terminal of said first inverter, said output terminal of said first inverter being connected to a first of said input terminals of said second amplifier, said output terminal of said second amplifier being connected to said output circuit of said generator and being connected to one of its said input terminals through an impedance device and being connected to a first of said input terminals of said first amplifier through a second impedance device, said output terminal of said first inverter being connected to one of said input terminals of said first amplifier



through a third impedance device, said switching device having a pair of output terminals and a pair of input terminals and first and second pairs of gating devices, each of said pairs of said gating devices being operable to connect said pair of input terminals of said switching device with said pair of output terminals of said switching device, first network means energized by said output quantities of said generator and one of said input means to provide a combined output quantity, means connecting said first network means to said input terminal of a second of said inverters, said switching device including switch control means for actuating said pairs of gating devices, second network means connecting said output terminal of said second inverter to said switch control means and effective to open said first or said second pair of gating devices depending upon which one of said first and said second control quantities is provided by said second inverter, means connecting the other of said input means to said pair of input terminals of said switching device, and an integrating network connected to said pair of output terminals of said switching device.

4,027,242

DOUBLE SUPERHETERODYNE MULTICHANNEL RECEIVER WITH A PHASE-LOCKED LOOP FREQUENCY SYNTHESIZER

Hiromasa Yamanaka, Tokyo, Japan, assignor to Shinto Denki Co., Ltd., Tokyo, Japan

Filed Oct. 23, 1975, Ser. No. 625,117

Claims priority, application Japan, Apr. 7, 1975, 50-42110

Int. Cl.² H04B *1/40*

U.S. Cl. 325—17 **2 Claims**

1. A transceiver capable of multichannel reception and a multichannel transmission, comprising in combination:

input means for reception of an incoming radio frequency signal;

a radio frequency amplifier for amplification of the incoming radio frequency signal;

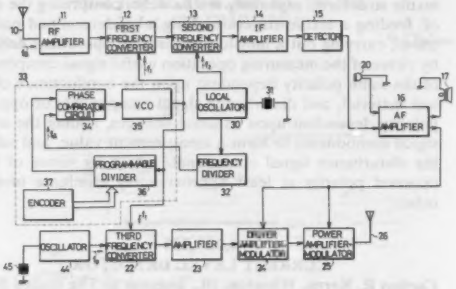
a first frequency converter for conversion of the amplified radio frequency signal from said radio frequency amplifier into a first intermediate frequency signal;

a second frequency converter for conversion of the first intermediate frequency signal from said first frequency converter into a second intermediate frequency signal;

a crystal-controlled local oscillator having a single crystal unit for production of an output signal of a predetermined frequency, the output signal from said local oscillator being supplied to said second frequency converter and being thereby combined with the first intermediate frequency signal from said first frequency converter to provide the second intermediate frequency signal;

a frequency divider for dividing the frequency of the output signal from said local oscillator at a predetermined ratio to provide an output signal having a reference frequency;

a phase-locked loop frequency synthesizer which is supplied with the reference frequency signal from said frequency divider and which supplies to said first frequency converter an output signal of a frequency selected in accordance with the frequency of the incoming radio frequency signal, the output signal from said frequency synthesizer being combined by said first frequency converter with the amplified radio frequency signal from said radio frequency amplified to provide the first intermediate frequency signal having a predetermined frequency



regardless of the frequency of the incoming radio frequency signal;

an intermediate frequency amplifier for amplification of the second intermediate frequency signal from said second frequency converter;

a detector for demodulation of the amplified second intermediate frequency signal from said intermediate frequency amplifier;

output means for translating output from said detector into audible sound;

a crystal-controlled oscillator having a single crystal unit for production of an output signal having the same frequency as the first intermediate frequency signal produced by said first frequency converter;

a third frequency converter for production of a signal of a desired transmitting frequency by combining the output signal from said oscillator with the output signal from said frequency synthesizer;

means for amplification of the transmitting frequency signal from said third frequency converter;

means for modulating the amplified transmitting frequency signal by an intelligence signal;

means for supplying the intelligence signal to said modulating means; and

means for radiating the modulated transmitting frequency signal into space.

4,027,243

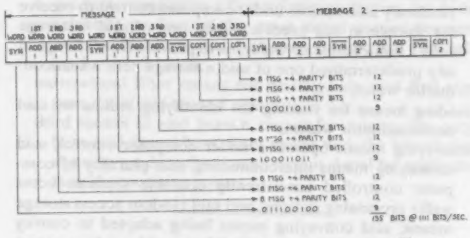
MESSAGE GENERATOR FOR A CONTROLLED RADIO TRANSMITTER AND RECEIVER

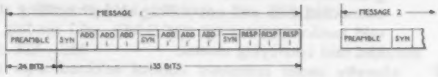
Bill L. Stackhouse, and Theodore E. Taylor, both of Lynchburg, Va., assignors to General Electric Company, Lynchburg, Va.

Filed May 12, 1975, Ser. No. 576,383

Int. Cl.² 325 *58;* **H04B** *1/00*

U.S. Cl. 325—53 **3 Claims**





1. For use in radio communication system having a command station transmitter for transmitting outbound messages, each outbound message being formed by a sequence of binary bits at a first rate and comprising a first synchronizing word of nine bits, a first address word of eight message bits and four parity bits and produced at least three times, a second synchronizing word of nine bits that are the binary inversion of said nine bits of said first synchronizing word, a second address word of eigth message bits and four parity bits and produced at least three times, a third synchronizing word of nine bits that are the binary inversion of said nine bits of said first synchronizing word, and a command word of eight message bits and four parity bits and produced at least three times; a command station receiver; a controlled station transmitter; and a controlled station receiver for receiving outbound messages from said command station transmitter, a message generator comprising:

a. first means for connection to said controlled station receiver for deriving a received outbound message transmitted by said command station transmitter, and received by said controlled station receiver;

b. second means connected to said first means for producing an inbound message only in response to a predetermined outbound message, said inbound message being formed by a sequence of binary bits at a second rate that is one and one half times said first rate and comprising a synchronizing preamble having a plurality of different binary bits, said first synchronizing word, said first address word produced at least three times, said second synchronizing word, said second address word produced at least three times, said third synchronizing word, and a response word of eight message bits and four parity bits and produced at least three times;

c. and third means connected to said second means for applying said produced inbound message to said controlled station transmitter.

4,027,244

REMOTE CONTROL SIGNAL TRANSMITTER INCLUDING VARIABLE RESISTOR WITH SWITCHING MEANS

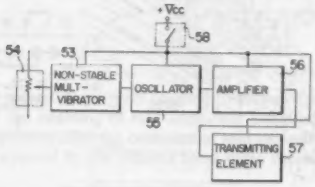
Shunji Minami, Moriguchi; Takehide Takemura, and Shunzo Oka, both of Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Division of Ser. No. 449,758, March 11, 1974, Pat. No. 3,916,369. This application June 27, 1975, Ser. No. 590,931

Claims priority, application Japan, Mar. 14, 1973, 48-30390; Mar. 14, 1973, 48-30391; May 30, 1973, 48-61300; Mar. 10, 1973, 48-29974[U]

Int. Cl.² H04B *1/04*

U.S. Cl. 325—118 **4 Claims**



1. A remote control signal transmitter comprising:

a variable resistor unit including a variable resistor and switching means;

non-stable multi-vibrator circuit means connected to said variable resistor, the duty cycle of said multi-vibrator being variable according to the resistance variation of said variable resistor;

oscillator circuit means connected to said multi-vibrator circuit means, the duration of an output signal of said oscillator circuit means being variable according to the duty cycle of said multi-vibrator circuit means;

amplifier circuit means; and

transmitting circuit means connected to said oscillator circuit means through said amplifier circuit means for transmitting a remote control signal, said switching means coupled to an electric energy source and interlocked with said variable resistor such that said switching means is operated to supply electric energy to for energizing said remote control transmitter only upon adjustment of said variable resistor.

4,027,245

NUMERICALLY CONTROLLED MACHINE TOOL

Pierre Bourrat, Elancourt; Paul Xavier Gosset, Velizy; Pierre Riss, Chatillon-sous-Bagneux, and Jean-Pierre Vignaud, Bailly, all of France, assignors to Regie Nationale des Usines Renault, France

Filed Apr. 8, 1975, Ser. No. 566,635

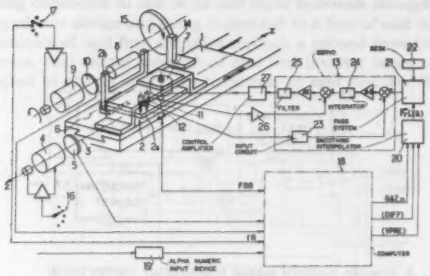
Claims priority, application France, Apr. 11, 1974, 74.12865

Int. Cl.² G06F *15/46;* **G05B** *19/18*

U.S. Cl. 235—151.11 **19 Claims**

1. A process of machining a three-dimensional surface of a workpiece driven in rotation about a first axis and displaced in translation along a second axis substantially parallel to the first, with respect to a tool, so that all the points of the surface of the said workpiece can be presented successively to the said tool, the distance between the tool and the workpiece being variable by relative displacement in a direction distinct from that defined by the two said axes, the process being effected by a numerically controlled machine tool comprising a computer having in store data permitting the surface to be machined to be defined by calculation, in which the speed of rotation of the said workpiece about the said first axis is controlled independently of the speed of displacement, of the workpiece along the said second axis, which is itself indepen-

dently adjustable, in which the relative position of the workpiece and tool is numerically controlled in the said direction as a function of the rotary speed and angular position of the workpiece relative to the first axis and its speed and position along the second axis in such a manner that the tool machines the desired surface, and in which the instruction for relatively positioning the workpiece and the tool is given in the form of a sum of a profile function and an ovalisation function, the profile function providing the dimension difference, measured perpendicularly to the said axis, between the profile of the said workpiece in a selected profile plane of the said workpiece, the plane passing through the first axis, and the generatrix contained in this same plane of the section of the basic body



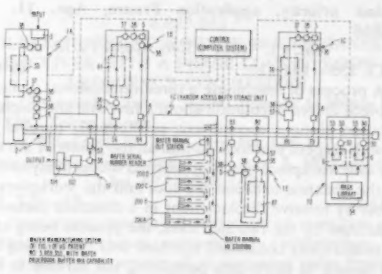
of revolution co-axial with the said first axis and circumscribed on the said workpiece in such a manner as to have in common with it at least one point on their respective surfaces, the said selected profile plane being chosen in such a manner as to contain the said point, and the ovalisation function being the dimension difference between the outline of the said workpiece in a section through a plane perpendicular to the first axis and a circle in this plane with its centre on the said first axis, the said circle being circumscribed on and tangent to at least one point on the said outline in the said section, the said difference of dimension being measured along a radius passing through the said first axis, in the sectional plane through the first axis.

4,027,246

AUTOMATED INTEGRATED CIRCUIT MANUFACTURING SYSTEM

George Anthony Caccoma; Paul Philip Castrucci, both of Poughkeepsie, and William Otto Druschel, Granite Springs, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 26, 1976, Ser. No. 670,596
Int. Cl.² G06F *15/46*
U.S. Cl. 235—151.1 8 Claims



1. A computer controlled manufacturing system for fabricating semiconductor wafers into large scale integrated circuit devices and wherein each semiconductor wafer has stored, or recorded thereon, distinct identifying indicia, such as a machine readable serial number, said system comprising:

a plurality of computer controlled concurrently operable semiconductor wafer processing stations, each of said stations being adapted to perform under computer control at least one discrete fabrication step;

random access storage means having *n* storage cells, each of said storage cells being adapted to store at least one semiconductor wafer, each of said *n* storage cells of said random access storage means being individually and randomly addressable under computer control to receive for storage in any predetermined one of said *n* storage cells a semiconductor wafer, or to provide from storage in any predetermined one of said *n* storage cells a semiconductor wafer;

reading means for reading the identifying indicia on said semiconductor wafers;

conveying means operative under computer control, said conveying means interconnecting said plurality of computer controlled concurrently operable semiconductor wafer processing stations, and said random access storage means, said conveying means being adapted to convey predetermined wafers to and from said random access storage means and selected ones of said processing stations;

and a digital computer system operable under stored program control means, said computer system being interconnected with and controlling said processing stations, said random access storage means, said reading means and said conveying means,

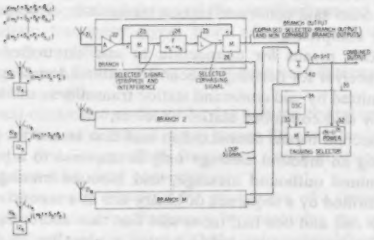
whereby under computer control selected ones of said semiconductor wafers randomly stored in said random access storage means may be selected and fabricated into first part number large scale integrated circuit devices, and selected second ones of said semiconductor wafers randomly stored in said random access storage means may be selected and fabricated into second part number large scale integrated circuit devices, where said first and second part number devices are not identical.

4,027,247

RECEIVER ESPECIALLY FOR USE AS A DIVERSITY COMBINING RECEIVER WITH CHANNEL SELECTION CAPABILITY

William Louis Aranguren, Sayreville, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Nov. 11, 1975, Ser. No. 631,193
Int. Cl.² H04L *27/14;* H04B *7/08*
U.S. Cl. 325—305 8 Claims



1. A receiver for receiving a signal comprising a carrier frequency with phase shift keying (PSK) information modulation transmitted from a source, the receiver comprising:

a branch circuit;

first means in said branch circuit capable of receiving as a branch input the transmitted signal from the source;

means for processing an output signal including a first signal term comprising a branch output frequency and the PSK information modulation from said branch circuit to pro-

duce a loop signal identified by the branch output frequency and the PSK information modulation, said processing means comprising a free-running oscillator tuned to generate an output signal having a frequency equal to a proportionate value of said branch output frequency, and means for mixing the branch output signal with the output signal from said oscillator to produce the loop signal;

second means in said branch circuit for mixing the loop signal with the branch input to produce desired sideband products comprising a first signal term having the desired sideband product of the input signal carrier frequency and the branch output frequency absent any PSK information modulation;

narrowband filter means for passing only said first signal term from said second means; and

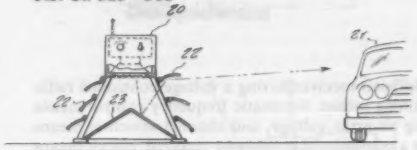
third means in said branch circuit for mixing the output from said narrowband filter means with the branch input signal to produce the branch output signal for application to said processing means.

4,027,248

MOTION PICTURE BROADCASTING SOUND DELIVERY SYSTEM

George R. Muzyka, 3825 N. Newcastle Ave., Chicago, Ill. 60634

Filed Oct. 14, 1975, Ser. No. 622,268
Int. Cl.² H04B 1/06, 11/00
U.S. Cl. 325—308 **2 Claims**



2. A sound delivery system comprises:

a receiver for an audio modulated carrier;

a transducer coupled to said receiver for producing sound waves in response to said audio;

a sound reflecting unit including a stationary baffle for reflecting said sound waves and a plurality of adjustable baffles for providing sound waves in a plurality of directions in response to reflecting action of said stationary baffle.

4,027,249

VEHICLE RADIO CONTROL UNIT

Kenneth J. Calman, 1121 E. Commercial Blvd., Fort Lauderdale, Fla. 33334

Filed Dec. 19, 1975, Ser. No. 642,555
Int. Cl.² H04B 1/16
U.S. Cl. 325—312 **8 Claims**

1. A self-contained control unit for use on an automotive vehicle having

a citizens band radio receiver,

and an additional audio entertainment appliance,

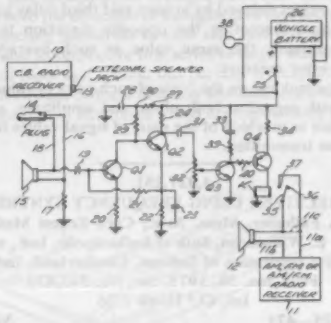
said control unit comprising:

relay means for controlling the operation of said additional audio entertainment appliance;

means for connecting said relay means to said additional audio entertainment appliance;

audio-operated switch means operatively connected to said relay means for causing the latter to disable said additional audio entertainment appliance while said switch means is operated and to enable said additional audio entertainment appliance after said switch means is no longer operated;

means for connecting said switch means to said citizens band radio receiver to be operated by incoming audio signals received by the latter; and



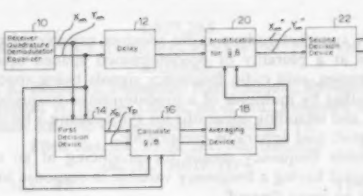
time delay means operatively coupled to said switch means to delay the enabling of said additional audio entertainment appliance after the cessation of said incoming audio signals received by the citizens band radio receiver.

4,027,250

APPARATUS AND METHOD FOR REDUCING EFFECTS OF AMPLITUDE AND PHASE JITTER

Gordon R. Lang, R.R. 1, Bolton, Ontario, Canada (L0P 1A0)

Filed Oct. 21, 1975, Ser. No. 624,384
Int. Cl.² H04B 1/10
U.S. Cl. 325—323 **10 Claims**



1. Means for correcting for the effects of transmission disturbances on data signal elements which are transmitted in pairs, each said pair being chosen from a predetermined set of pairs of signal values, at regular intervals by means of quadrature modulation and demodulation comprising:

means for measuring the signal values, as received, of the respective signal elements of sequentially transmitted quadrature pairs,

means responsive to such measurement of the value of each signal element for making a first decision as to which of the pairs of signal values from said set was transmitted,

means for comparing measured signal values and decisions values of corresponding signal elements, obtaining from such comparisons, measures of the amplitude and phase errors caused by distances during transmission,

means for averaging the measures of the amplitude errors over a first predetermined number of intervals to obtain an average amplitude error measure,

means for averaging the measure of the phase angle errors over a second predetermined number of intervals to obtain an average phase angle error measure,

means for transmitting said measured signal values over a line,

means in said last mentioned line for delaying for at least a third predetermined number of intervals, the transmission of the measured signal values,

means for modifying the amplitude of the pairs of measured signal values delayed by said at least third delay by multi-

plying the amplitude of said measured signal values by approximately the inverse of said average amplitude error measure;

and means for modifying the phase of the pairs of measured signal values delayed by at least said third delay to correct the phase thereof in the opposite direction to and in approximately the same value as such average phase angle error measure;

means for making, on the basis of such pairs of values modified with regard to both phase and amplitude, a second decision as to which of the pairs of signal values from said set was transmitted.

4,027,251

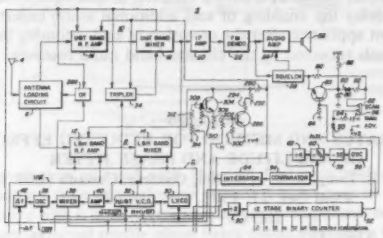
RADIO RECEIVER USING FREQUENCY SYNTHESIZER

George H. Fathauer, Mesa, Ariz.; Cecil Ernest Mathis, and Warren L. Williamson, both of Indianapolis, Ind., assignors to Masco Corporation of Indiana, Cumberland, Ind.

Filed Jan. 30, 1975, Ser. No. 545,432

Int. Cl.² H04B *1/26*

U.S. Cl. 325—421 **36 Claims**



8. A superheterodyne radio receiver capable of receiving signals at a plurality of predetermined spaced apart radio frequencies, said radio frequency signals being spaced from each other by multiples of a predetermined frequency increment, and including apparatus for synthesizing a local oscillator signal, said apparatus comprising:

variable frequency means for producing at an output a signal having a frequency variable in response to a signal at an input thereof;

circuit means coupled to said variable frequency means output and producing at an output said local oscillator signal at the frequency of said variable frequency means output signal multiplied by a number N;

offset signal means including an offset oscillator for generating an offset oscillator signal;

signal mixing means coupled to said offset signal means and said variable frequency means and producing an output signal at a frequency responsive to the frequencies of said variable frequency signal and said offset oscillator signal;

frequency divider means coupled to an output of said signal mixing means and producing at an output a signal at a frequency which is related to the frequency of said signal mixing means output signal and is at most the frequency of said signal mixing means output signal divided by a number K;

reference signal means including a reference oscillator for generating a reference oscillator signal at a frequency greater than the frequency of said predetermined frequency increment divided by the product of N times K;

comparator means coupled to said output of said frequency divider means and said reference frequency means and producing an output signal responsive to the frequency relationship of said frequency divider means output signal and said reference oscillator signal, said output signal being coupled to said variable frequency means input;

control means for controlling the frequency to which said receiver is tuned being coupled to said frequency divider means and operative to alter the frequency relationship between said signal mixing means output signal and said frequency divider means output signal; and

offset signal frequency alteration means coupled to said control means and said offset signal means for altering the frequency of said variable frequency signal by altering the frequency of said offset oscillator signal in response to said control means.

4,027,252

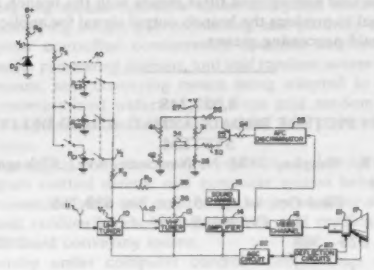
TUNING VOLTAGE CIRCUIT

Rangaswamy Arumugham, Batavia, N.Y., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed Dec. 12, 1975, Ser. No. 640,010

Int. Cl.² H03J *5/02*

U.S. Cl. 325—464 **11 Claims**



1. In a television receiver having a voltage controlled radio frequency tuning means, automatic frequency control means for providing an error voltage, and channel selection means for selecting a television channel to be received, circuit means for providing a tuning voltage to said tuning means comprising:

a source of energizing voltage;

first and second resistance means connected in series with said source;

variable means coupled to said first and second resistance means for varying the relative magnitudes of said first and second resistance means, said first resistance means having a large resistance relative to the maximum resistance of said second resistance means; and

third and fourth resistance means connected in series between said variable means and said automatic frequency control means with a junction between said third and fourth resistance means being connected to the input of said tuning means, said fourth resistance means having a large resistance relative to the resistance of said second and third resistance means.

4,027,253

NON-RECIPROCAL BROADBAND SLOT LINE DEVICE

Bernard Chiron, and Michel de Vecchis, both of Paris Cedex, France, assignors to Societe Lignes Telegraphiques et Telephoniques, Paris, France

Filed May 15, 1974, Ser. No. 470,614

Claims priority, application France, May 18, 1973, 73.18044

Int. Cl.² H01P *1/38, 1/36*

U.S. Cl. 333—1.1 **13 Claims**

1. A wideband non-reciprocal microwave device comprising:

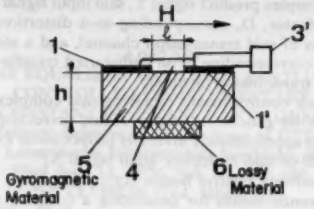
a planar slot line formed of two metallic strips having a slot therebetween,

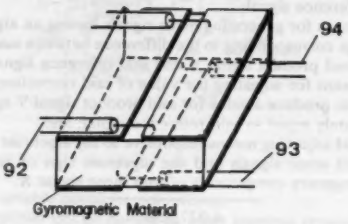
a plate oriented parallel to said planar slot line and placed within the microwave field of said planar slot line, said plate made of gyromagnetic material, magnetized by a

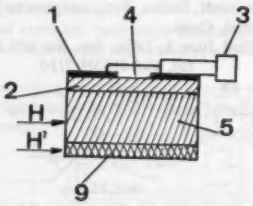
d.c. magnetic field both perpendicular to the slot and parallel to the plane of the slot line,

at least one attenuation means placed against the face of the said plate which is most remote from the said slot line, wherein:

said slot has a width *l*,







said plate has a thickness *h* and a length L,

the thickness *h* of the said plate is larger than 3*l*, and

the length L of the said plate is at least equal to a half wave length measured in the slot line at the maximum operating frequency.

4,027,254

DIRECTIONAL COUPLER HAVING INTERDIGITAL COMB ELECTRODES

David John Gunton, and Edward George Sydney Paige, both of Malvern, England, assignors to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

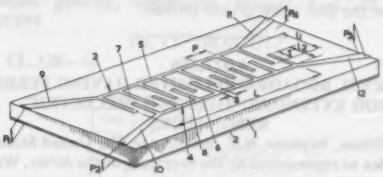
Filed Jan. 30, 1976, Ser. No. 653,861

Claims priority, application United Kingdom, Feb. 11, 1975, 5839/75; Mar. 10, 1975, 9920/75

Int. Cl.² H01P *5/18*

U.S. Cl. 333—10 **6 Claims**

1. A directional coupler comprising a dielectric substrate having two opposing faces, a ground sheet electrode on one face of said substrate, first and second elongated bus bars disposed in spaced relation to one another on the other face of said substrate, a first series of finger electrodes extending from said first bus bar at spaced locations distributed along substantially the entire length of said first bus bar, said first series of finger electrodes being disposed transverse to the direction of elongation of said first bus bar and projecting therefrom toward said second bus bar, a second series of finger electrodes extending from said second bus bar at spaced locations distributed along substantially the entire length of said second bus bar, said second series of finger electrodes being disposed transverse to the direction of elongation of said second bus bar and projecting therefrom toward said first bus bar, said first bus bar and its respective first series of finger electrodes being separated from said second bus bar and its respective second finger electrodes to form first and second electrically isolated interdigital comb structures which are capacitively coupled to



one another, means providing an input port and an output port for each of said comb structures, said input and output ports being disposed at opposite ends of each of said bus bars respectively for applying signals to and extracting signals from the coupler, the two output ports for said two comb structures being located at adjacent ends of said first and second bus bars respectively, whereby a proportion of signal power applied to the input port at one end of one of said comb structures is coupled to the remote output port at the other end of the other comb structure.

4,027,255

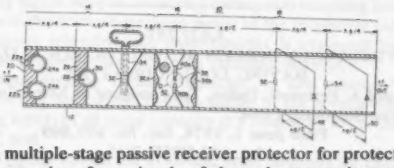
FAST RECOVERY TIME RECEIVER PROTECTOR FOR RADARS

Herbert K. Blakeney, Pasadena; Harry Goldie, Randallstown, and Ronald W. Savoie, Laurel, all of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 22, 1975, Ser. No. 624,622

Int. Cl.² H01P *1/14*

U.S. Cl. 333—13 **11 Claims**



1. A multiple-stage passive receiver protector for protecting a radar receiver from signals of the radar transmitter, said receiver protector comprising:

a. a waveguide having a predetermined center frequency characteristic λ_p, and having an r.f. energy input end and an r.f. energy output end,

b. at least one halogen gas discharge stage disposed at a position in the r.f. energy input end of the waveguide, said halogen gas discharge stage having a short recovery period to permit the r.f. energy signals to pass to the receiver after the transmitter signal terminates,

c. a rapid start-up gas discharge stage having a gas chamber including a metallic structure with a radioactive priming substance said rapid start-up gas discharge stage also including a semi-inert gaseous medium for protective immersion of the metallic structure therein, said rapid gas discharge stage being disposed at another position of the waveguide separated from said halogen gas discharge stage by a distance substantially equal to $(2N+1)\ \lambda_g/4$ where N is an integral number, said rapid start-up gas discharge stage having a sustaining threshold below the

extinguishing power capability of said halogen gas discharge stage, said rapid start-up gas discharge stage having the characteristic of firing to protect the receiver from initial signals from the radar transmitter, and

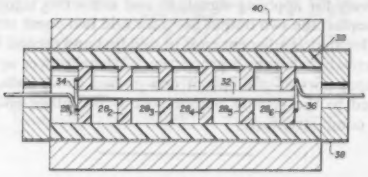
d. a first diode power limiter disposed in the waveguide in the direction of r.f. energy flow from said rapid gas discharge stage and spaced therefrom by a distance substantially equal to $N\lambda_g/2$, said first diode power limiter being operative to reflect a null back to said rapid gas discharge stage to cooperate with the operation of the rapid start-up gas discharge stage to cause it to effectively require a higher firing threshold than its normal firing threshold after an initial period following the action of r.f. power upon the first diode power limiter.

4,027,256

LOW LEVEL BROADBAND LIMITER HAVING FERRITE ROD EXTENDING THROUGH DIELECTRIC RESONATORS

Samuel Dixon, Neptune, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed July 9, 1976, Ser. No. 703,714
Int. Cl.² H01P 1/22, 5/00
U.S. Cl. 333—17 L **11 Claims**



1. A microwave power limiter having a plurality of coupled dielectric resonators adapted to propagate power from an input end to an output end wherein the improvement comprises:

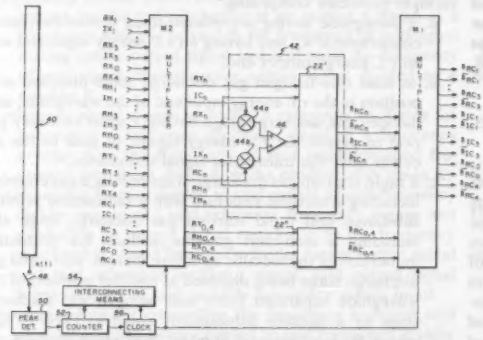
a relatively long, thin ferrite rod element biased to subsidiary resonance extending between said plurality of resonators which thereby operates to increase the dynamic power range of the device as well as serving to decrease the critical threshold field at which power limiting occurs.

4,027,257

FREQUENCY DOMAIN AUTOMATIC EQUALIZER HAVING LOGIC CIRCUITRY

Donald A. Perreault, Dallas, Tex., assignor to Xerox Corporation, Stamford, Conn.

Filed June 1, 1976, Ser. No. 691,809
Int. Cl.² H03H 7/16
U.S. Cl. 333—18 **25 Claims**



1. A frequency domain equalizer for automatically equalizing the spectral components of a received signal transmitted through a distortion affected transmission channel comprising:

a. multiplying means for performing a complex multiplication of a complex input signal X and a complex multiplicand correction signal C, said multiplying means generating a complex product signal Y, said input signal X having a first factor, D, corresponding to a distortion transfer function of said transmission channel, and a second factor, H, corresponding to an undistorted transfer function of said transmission channel;

b. feedback control means receiving said complex product signal Y for generating a value of said correction signal C which is approximately inversely proportional to said first factor D of said multiplier input signal X;

c. said feedback control means comprising:

1. reference means for generating a complex reference signal proportional to said second factor, H, of said input signal X;

2. means for comparing said product signal Y with said reference signal;

3. means for generating error signals having an algebraic sign corresponding to the difference between said compared product signal Y and said reference signal;

4. means for adjusting the value of said correction signal C to produce a value for said product signal Y approximately equal to said reference signal; and

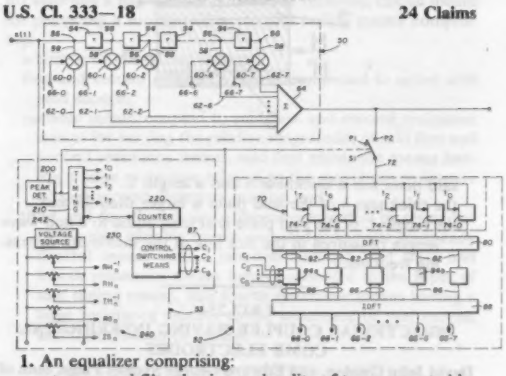
5. said adjusting means responsive to the algebraic sign of said error signals and the algebraic sign of real and imaginary components of said input signal X.

4,027,258

TIME DOMAIN AUTOMATIC EQUALIZER WITH FREQUENCY DOMAIN CONTROL

Donald A. Perreault, Dallas, Tex., assignor to Xerox Corporation, Stamford, Conn.

Filed June 1, 1976, Ser. No. 691,808
Int. Cl.² H03H 7/16
U.S. Cl. 333—18 **24 Claims**



1. An equalizer comprising:

a. a transversal filter having a plurality of taps separated by time delay intervals t, said transversal filter receiving input signals from a transmission channel having a distortion transfer function $D(w)$ and an undistorted transfer function $H(w)$, said transversal filter providing output signals,

b. means for sampling said output signals from said transversal filter at spaced time intervals t,

c. means for transforming said sampled output signals into frequency representations thereof,

d. means for providing frequency representations associated with the undistorted transfer function $H(w)$ of the transmission channel,

e. means responsive to said frequency representations of said sampled output signals and said frequency representations associated with said undistorted transfer function for providing samples of a transfer function substantially equal to $1/D(w)$,

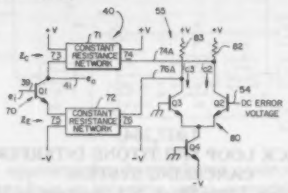
f. means for converting said samples of said transfer function substantially equal to $1/D(w)$ into a time domain sample set, and

g. means for applying said time domain sample set as weights for said taps for providing time domain equalization for said transmission channel.

4,027,259
LINE EQUALIZER WITH DIFFERENTIALLY CONTROLLED COMPLEMENTARY CONSTANT RESISTANCE NETWORKS

Neale A. Zellmer, Belmont, Calif., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed June 14, 1976, Ser. No. 695,699
Int. Cl.² H03H 7/14; H04B 3/14
U.S. Cl. 333—28 R **16 Claims**



1. A variable equalizer comprising:

an amplifier circuit having an input terminal receiving unequalized signals, having a forward gain loop, having a feedback loop, and having an output terminal from which equalized signals are coupled;

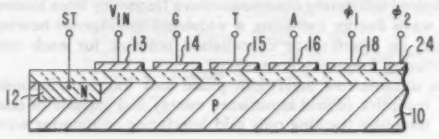
first and second constant resistance networks in said forward and feedback loops, respectively, of said amplifier; and

means for terminating said first and second networks in associated impedances having values which vary in an opposite manner.

4,027,260
CHARGE TRANSFER CIRCUITS EXHIBITING LOW PASS FILTER CHARACTERISTICS

James Edward Carnes, North Brunswick; Robert Herman Dawson, Princeton; Robert Thomas Fedorka, and Henry William Kaiser, both of Cherry Hill, all of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Jan. 14, 1976, Ser. No. 648,929
Int. Cl.² G11C 11/34, 27/02; H01L 29/78; H03H 7/10
U.S. Cl. 333—70 R **8 Claims**



1. A method for translating an input signal to a charge which is to be propagated down a charge transfer register, the signal having an information component in a relatively lower frequency band and relatively higher frequency components, comprising the steps of:

sampling the signal during N successive, discrete time intervals which are spaced from one another by intervening time intervals, where N is an integer equal to at least 2 and where the frequency corresponding to the total period during which the N samples are taken is greater by a factor of at least two than the bandwidth of the information component of the signal;

in response to each signal sample, producing a charge packet of amplitude proportional to that of the signal sample;

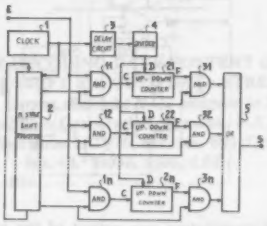
combining the N charge packets thereby obtained to form a single charge packet; and

propagating the single charge packet down the register.

4,027,261
SYNCHRONIZATION EXTRACTOR

Pierre Laurent, and Ljubimko Milošević, both of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Aug. 25, 1975, Ser. No. 607,510
Claims priority, application France, Aug. 27, 1974, 74.29294
Int. Cl.² H03K 1/17
U.S. Cl. 328—63 **8 Claims**



1. A synchronization extractor comprising:

a terminal for receiving an input signal containing useful pulses with a predetermined recurrence period T and accompanying parasitic pulses;

a source of clock pulses having a frequency n/T, n being an integer greater than 1;

a set of n reversible pulse counters each provided with a forward-stepping input and a reverse-stepping input, each of said pulse counters further having an output stage emitting a discriminating signal upon attainment of a predetermined pulse count;

timing means controlled by said source for establishing consecutive periods T each divided into n sampling intervals respectively allocated to said pulse counters, said timing means being connected to said terminal for delivering signal samples occurring during said sampling intervals to the forward-stepping inputs of the respective pulse counters whereby each pulse counter is advanced by a pulse present in the allocated sampling interval;

frequency-dividing means connected to said source for delivering backward-counting pulses to the reverse-stepping inputs of all pulse counters at a frequency lower than $1/T$; and

a load circuit connected to all said pulse counters for exclusive energization, in response to said discriminating signal, by pulses occurring in a sampling interval allocated to a pulse counter attaining said predetermined pulse count.

4,027,262
PHASE DETECTOR EMPLOYING QUADRUPLE MEMORY ELEMENTS

Claude A. Sharpe, Fort Lauderdale, Fla., assignor to The Bendix Corporation, Southfield, Mich.

Filed Mar. 2, 1976, Ser. No. 663,181
Int. Cl.² H03K 5/20
U.S. Cl. 328—133 **6 Claims**

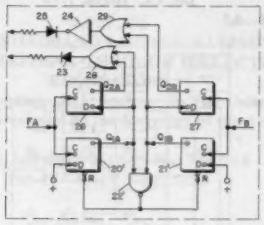
1. In a phase detector which includes a pair of preconditionable, resettable, clock pulse operated memory elements for comparing the phase of two input signals, one such signal providing clock pulses for one said memory element, the other such signal providing clock pulses for the other said memory element, the outputs of said memory elements constituting the phase detector outputs, the improvement comprising

an additional pair of preconditionable, clock pulse operated memory elements;

means applying the output of one of said memory elements of said first-named pair to precondition one of said memory elements of said additional pair;

means applying one said input signal as clock pulses both to the one of said additional pair of memory elements and to the one of said first-named pair of memory elements serving to precondition said one of said additional pair of memory elements;

means combining the output of said one of said first-named pair of memory elements with the output of said one of said additional pair of memory elements, said combined



outputs constituting one output of the improved phase detector;

means applying the output of the other of said memory elements of said first-named pair to precondition the other of said memory elements of said additional pair;

means applying the other said input signal as clock pulses both to the other of said memory elements of said additional pair and to the other of said first-named pair of memory elements; and

means combining the output of the other of said memory elements of said additional pair with the output of the other of said memory elements of said first-named pair, said last-named combined outputs constituting the other output of the improved phase detector.

4,027,263

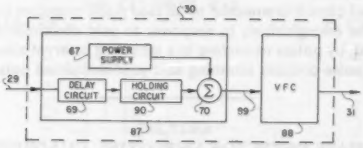
FREQUENCY GENERATOR

Raymond H. Bittel, Reston, Va.; Harry A. Helm, Bethesda, Md., and Maurice J. Raffensperger, Reston, Va., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Division of Ser. No. 571,175, April 24, 1975, Pat. No. 3,992,580. This application May 7, 1976, Ser. No. 684,034

Int. Cl.² H03K *5/00*

U.S. Cl. 328—151 **1 Claim**



1. An adjustable frequency generator comprising:

a. delaying means for passing a signal gradually having an input for receiving a voltage adjusting signal and an output;

b. holding circuit means for holding and transmitting a continuous voltage signal equivalent to the last received voltage signal having an input connected to said delaying means output and an output;

c. a voltage power supply for providing a continuous voltage signal corresponding to a base frequency having an output;

d. summing means for adding the power supply signal and the voltage adjusting signal from said holding circuit means output having a first input connected to said power supply output, a second input connected to said holding circuit means output and an output providing a voltage signal; and

e. a voltage to frequency converter having an input connected to said summing means output whereby a voltage error signal received by said delaying means input results in a corresponding change in the frequency of the converter.

4,027,264

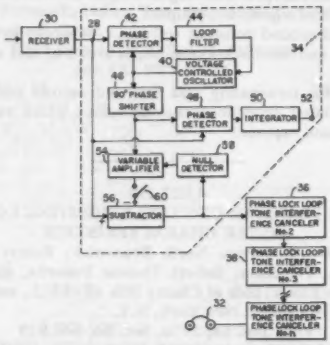
PHASE LOCK LOOP MULTITONE INTERFERENCE CANCELING SYSTEM

Frank S. Gutleber, Little Silver, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Feb. 24, 1976, Ser. No. 660,965

Int. Cl.² H03D *3/24*

U.S. Cl. 328—167 **7 Claims**



1. In a communication system for removing at least one undesired interfering continuous wave frequency from incoming wave energy including a wideband intelligence-bearing signal, an interference cancellation network for each said interfering frequency comprising:

an ultra-narrow bandwidth phase lock loop continuously receptive of said input wave energy and capable of continuously tracking only said interfering continuous wave frequency,

said phase lock loop including a voltage controlled oscillator which can be swept in frequency over the spectral range of the intelligence-bearing signal until the interfering frequency is encountered,

said phase lock loop further including a phase detector coupled to said oscillator and to said incoming wave energy and a narrow band low pass filter.

the output of said oscillator being a replica of said interfering continuous wave frequency, and

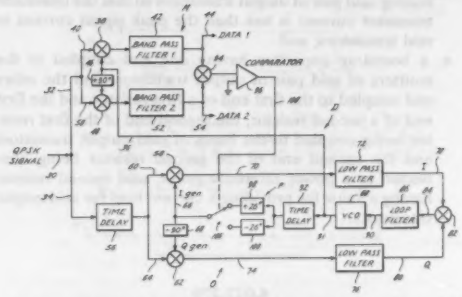
circuit means responding to the output of said oscillator and to said incoming wave energy for canceling from said incoming wave energy said interfering continuous wave frequency only while said oscillator is frequency locked to the interfering frequency.

4,027,265

UNBALANCED QUADRIPHASE DEMODULATOR

Herbert S. Kobayashi, Webster, and Sydney P. Bradfield, III, Houston, both of Tex., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed June 3, 1976, Ser. No. 692,414
Int. Cl.² H03D 3/06
U.S. Cl. 329—122 18 Claims



1. An apparatus for demodulating quaternary phase-shift keyed data from an incoming signal, comprising:

a. local oscillator means for forming a demodulating signal;

b. phase adjusting means for adjusting the phase of the demodulating signal to achieve phase synchronization with one of the four phases of the quaternary phase-shift keyed data in the incoming signal; and

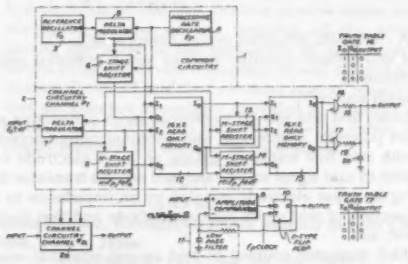
c. means for multiplying the demodulating signal with the incoming signal to demodulate the data therefrom.

4,027,266

DIGITAL FSK DEMODULATOR

James Monroe Clark, Cedar Grove, N.J., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed June 10, 1976, Ser. No. 694,733
Int. Cl.² H03D 3/00; H03K 9/06; H04L 27/14
U.S. Cl. 329—105 49 Claims



1. A digital frequency shift keyed (FSK) demodulator comprising:

a first source of an analog reference signal;

a second source of analog FSK signals;

first digital means coupled to said first source to produce an inphase digital representation of said reference signal having the form cos A, where A is an angle, and a quadrature digital representation of said reference signal having the form sin A;

second digital means coupled to said second source to produce an inphase digital representation of said FSK signals having the form cos B, where B is an angle, and a quadrature digital representation of said FSK signals having the form sin B;

third digital means coupled to said first and second digital means to produce an inphase code signal and a quadrature code signal for estimating the value of (B−A);

fourth digital means coupled to said third digital means responsive to said inphase and quadrature code signals to determine whether the value of (B−A) is increasing or decreasing, said fourth digital means having an inphase output and a quadrature output;

fifth digital means coupled to said inphase and quadrature outputs to determine whether a first given code is detected more frequently than a second given code and vice versa; and

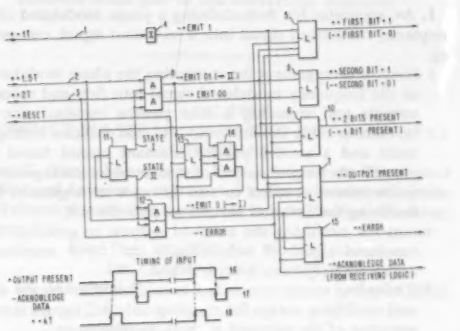
averaging means coupled to said fifth digital means to average the difference between said first and second given codes to produce a high voltage for a mark and a low voltage for a space.

4,027,267

METHOD OF DECODING DATA CONTENT OF F2F AND PHASE SHIFT ENCODED DATA STREAMS

Larry Donald Larsen, Raleigh, N.C., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed June 1, 1976, Ser. No. 691,739
Int. Cl.² H03K 9/08, 13/01
U.S. Cl. 329—106 8 Claims



1. In a decoder apparatus having logic means for comparing signal indications from a demodulator and also having at least two alternative decode value tables called states in which data contents may be interpreted in accordance with said indications from said demodulator, a method of decoding the data contents of F2F or two phase shift encoded data streams which have been demodulated in a demodulator to extract the characteristic 1F and 2F frequency pulses contained in such codes and between which pulses said demodulator has performed measurements and comparisons to characterize the intervals of time or distance contained between each pair of like polarity pulses as being equal to 1T, 1.5T, or 2T, where T is the nominal minimum distance or time normally occurring between two 1F pulses in said codes, said decoder also being provided with an indication of the type of code to be decoded and with the indications of the results of said interval characterization from said demodulator, the method of selecting a decoding state in said decoder and decoding said data contents in accordance with said interval indications comprising steps performed in said decoder of:

controlling the decoding state of said decoder in accordance with said interval indication received from said demodulator for the two most recently received like polarity pulses in said encoded stream of data;

selecting a set of possible data contents for the portion of said code stream encompassed by said two most recently received like polarity pulses in accordance with said decoding state of said decoder; and

selecting and outputting the particular data content from said set of possible data contents in said state in accor-

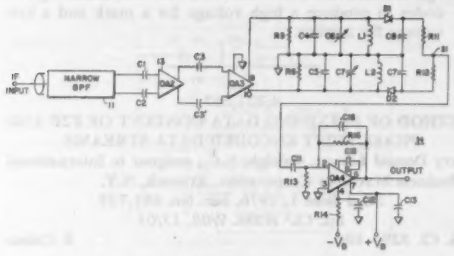
dance with said interval indication, thereby decoding the portion of said code lying between said two last received like polarity pulses.

4,027,268

DEMODULATOR FOR PM OR FM SIGNALS

Kenneth H. Brown, Scottsdale, Ariz., assignor to Motorola, Inc., Chicago, Ill.

Filed June 12, 1975, Ser. No. 586,473
Int. Cl.² H03D *3/26*
U.S. Cl. 329—142 **1 Claim**



1. An apparatus for demodulating a phase modulated or a frequency modulated signal into a baseband signal, comprising:

a detector arrangement for converting the phase modulated or the frequency modulated signal into first and second outputs and including a first passive resonant circuit tuned to provide the first output of said detector arrangement and a second passive resonant circuit tuned to provide the second output of said detector arrangement;

resistive means coupled to said detector arrangement for summing the first and second outputs thereof,

means for modifying the summed outputs to generate the baseband signal of substantially the same amplitude across its frequency spectrum; and

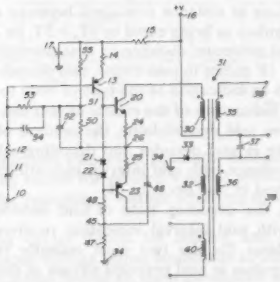
AC coupling means connected to said resistive means and said modifying means for coupling only AC signals representative of the summed outputs therebetween.

4,027,269

AUDIO LINE DRIVER AMPLIFIER

Whitney Robertson Campbell, Elk Grove Village, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed June 30, 1975, Ser. No. 591,587
Int. Cl.² H03F *1/38*
U.S. Cl. 330—13 **6 Claims**



1. An audio line driver amplifier having an output with high impedance comprising:

a. a pair of complementary output transistors each having a base, an emitter and a collector with the emitters of both transistors being coupled together and the collectors of both transistors defining the output;

b. drive means having an input adapted to receive input signals and an output connected to the bases of said transistors for providing driving current thereto in response to the input signals;

c. feedback means coupled from the emitters of said pair of output transistors to the input of said drive means;

d. bias means connected to said pair of output transistors for biasing said pair of output transistors so that the quiescent transistor current is less than the peak signal current in said transistors; and

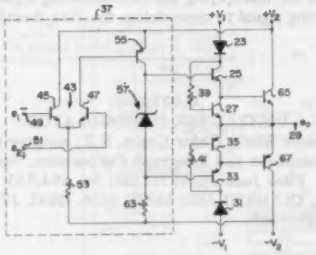
e. a bootstrap capacitor having one end coupled to the emitters of said pair of output transistors and the other end coupled to the first end of a first resistor and the first end of a second resistor, the second end of the first resistor being coupled to the bases of said output transistors and the second end of the second resistor being connected to a power reference point, said second resistor having a value for providing a current load for said output transistors.

4,027,270

CLASS ABC AMPLIFIER CIRCUIT

Ira Jay Pitel, Williamsport, Pa., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed Mar. 11, 1976, Ser. No. 666,026
Int. Cl.² H03F *3/26*
U.S. Cl. 330—15 **14 Claims**



1. A class ABC amplifier circuit comprising:

first and second potential sources and a potential output terminal;

a signal source;

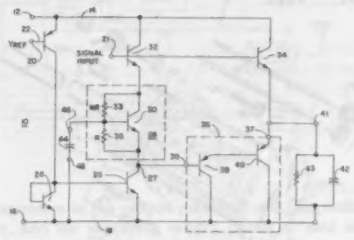
a diode, first and second transistors series connecting said first potential source and said potential output terminal with said first transistor having an input electrode coupled to said signal source and said second transistor having an input electrode coupled by an impedance to the junction of said series connected diode and first transistor; and

a third transistor coupled to said second potential source and to said potential output terminal and having an input electrode coupled to the junction of said series connected first and second transistors, said third transistor being connected in a parallel-like configuration with said series connected diode, first and second transistors whereby a potential at said output terminal of a value less than the potential value of said first potential source effects conductivity from said first potential source by way of said series connected diode, first and second transistors and non-conductivity from said second potential source to said output terminal and a potential at said output terminal of a value greater than the potential value of said first potential source effects non-conductivity from said first potential source and conductivity from said second potential source by way of said third transistor to said output terminal.

4,027,271
CAPACITOR STRUCTURE AND CIRCUIT FACILITATING INCREASED FREQUENCY STABILITY OF INTEGRATED CIRCUITS

David L. Cave, Mesa, and Walter R. Davis, Tempe, both of Ariz., assignors to Motorola, Inc., Chicago, Ill.

Division of Ser. No. 430,267, Jan. 2, 1974, Pat. No. 3,953,875.
This application Nov. 6, 1975, Ser. No. 629,728
Int. Cl.² H03F 3/04
U.S. Cl. 330—22 8 Claims



1. In a monolithic integrated amplifier including an input section adapted to receive an input signal, an output section for developing an output signal across a load impedance connected thereto, the output section having a first input node at which the value of impedance developed thereat is dependent on the load impedance, a frequency stabilization circuit for preventing the impedance developed at the input node from reaching a value that would otherwise cause the amplifier to oscillate, comprising in combination;

bias network means interposed between the input section and the input node of the output section and including first electron control means having first, second and control electrodes, said first electrode being connected to the input node, said second electrode being connected to an output node of the input section, and resistive divider means coupled across said first and second electrodes and to said control electrode of said first electron control means, said first electron control means having a predetermined current amplification factor; and

capacitive means adapted to be coupled between said control electrode of said first electron control means and an alternating current ground potential of the amplifier circuit, the value of the impedance of said capacitive means being effectively multiplied by said current amplification factor of said first electron control means such that the effective impedance provided at the input node of the output section by said bias network means sufficiently prevents the undesirous oscillations.

4,027,272
AMPLIFIER

Hiromasa Kimura, Kawaguchi, Japan, assignor to Sony Corporation, Tokyo, Japan

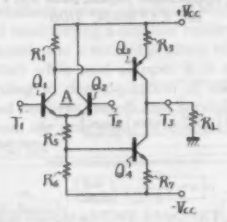
Filed June 4, 1976, Ser. No. 692,745
Claims priority, application Japan, June 6, 1975, 50-68707
Int. Cl.² H03F 3/45
U.S. Cl. 330—30 D 9 Claims

1. An amplifier comprising:

a. a differential amplifier consisting of first and second transistor each having first, second and third electrodes, the first electrodes of said first and second transistors being connected to first and second input terminals, respectively, the second electrode of said first transistor being connected to one terminal of a voltage source through a first impedance, and the third electrodes of said first and second transistors being connected together to the other terminal of said voltage source through a common impedance means having an intermediate tap;

b. a third transistor having first, second and third electrodes, said first electrode of the third transistor being connected to the second electrode of said first transistor and said second electrode of the third transistor being connected to said one terminal of said voltage source, said third electrode of the third transistor being connected to an output terminal; and

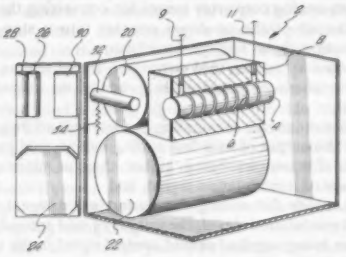
c. a fourth transistor having first, second and third electrodes, said first electrode of the fourth transistor being connected to said intermediate tap of said common impedance means, said second electrode of the fourth transistor being connected to the other terminal of said voltage source, said third electrode of the fourth transistor being connected to the third electrode of said third transistor, said fourth transistor causing reduction of the common mode gain of said differential amplifier.



4,027,273
COMPACT PULSED LASER HAVING IMPROVED HEAT CONDUCTANCE

Lien C. Yang, Los Angeles, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Dec. 21, 1972, Ser. No. 317,310
Int. Cl.² H01S 3/045, 3/092
U.S. Cl. 331—94.5 P 2 Claims



1. A compact, pulsed, manually-portable laser assembly comprising:

a laser rod;

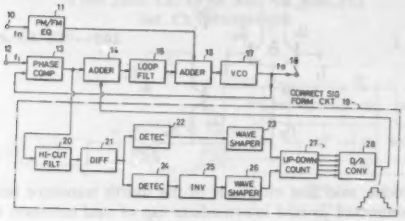
a source of light energy positioned in close proximity to said laser rod for controllably irradiating said laser rod with pulsed light energy; and

cooling means for effectively dissipating heat produced by said laser rod and said source of light energy, said cooling means consisting of a solid heat sink having a cavity in which said laser rod and source of light energy are housed, said heat sink being made of a material wherein both the heat conductance and resistivity characteristics thereof differ in a radial direction extending from the laser rod from such characteristics in a direction parallel to the axis of said laser rod, said heat produced in said cavity by said laser rod and said source of light energy being dissipated by said solid heat sink.

4,027,274
PHASE LOCKED LOOP CIRCUIT

Kiyotake Fukui, Settsu; Hiroshi Matsushima, Neyagawa, and Yukinobu Ishigaki, Yamato, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma and Victor Company of Japan, Limited, Yokohama, both of, Japan

Filed June 23, 1975, Ser. No. 589,546
Claims priority, application Japan, June 25, 1974, 49-72541
Int. Cl.[2] H03C 3/06
U.S. Cl. 332—19 2 Claims



1. A phase locked loop circuit comprising:

two input phase comparator means having an operation range with specific limits of phase comparison, one of said inputs being supplied with a carrier wave;

voltage-controlled oscillator means for generating output frequencies which are controlled responsive to a control signal, said output frequencies being supplied to the other input of the phase comparator;

differentiation means responsive to the output of the phase comparator means for producing differentiated output pulses of positive or negative polarities each time that the phase deviation of the output of the voltage-controlled oscillator means exceeds the limits of the operation range of the phase comparator means;

detecting means for discriminating between the polarities of the differentiated pulses;

up-down counter means for counting in either an upward direction or a downward direction responsive to the discriminated polarities of the differentiated pulses;

digital-to-analog converter means for converting the resulting output of the up-down counter into a step-shaped correction signal voltage waveform;

first means for adding said correction signal and an output of the phase comparator to produce an output error signal;

loop filter means for eliminating predetermined frequencies from the output of said first adding means, said predetermined frequencies being higher than a minimum frequency of a modulation signal; and

second means for adding the output error signal and an input modulation signal, the output of said second adding means being supplied as said control signal to the voltage-controlled oscillator;

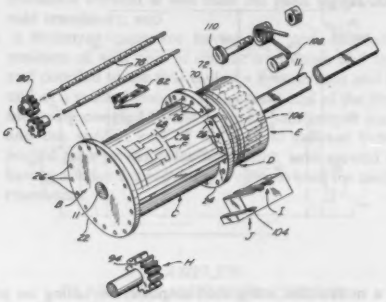
said output frequencies of the voltage-controlled oscillator being an angle-modulated carrier wave produced responsive to said input modulation signal.

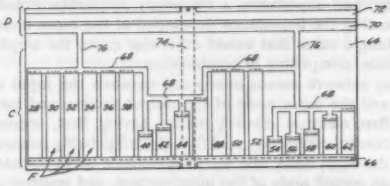
4,027,275
CONTROLLER FOR A VARACTOR TUNER

Robert D. Whelan, W. Springfield, and Richard D. Gibson, Wilbraham, both of Mass., assignors to General Instrument Corporation, Clifton, N.J.

Filed Mar. 30, 1976, Ser. No. 671,821
Int. Cl.[2] H03J 5/30; H01C 10/42
U.S. Cl. 334—15 37 Claims

1. A controller comprising a support, a turret rotatably mounted on said support and having a substantially cylindrical surface, said turret comprising a signal determining portion having situated on said surface a plurality of resistive strips, and first and second conductive strips, said first conductive strip being connected to one end of each of said resistive strips and said second conductive strip being connected to the other end of each of said strips, an electrical coupling portion extending axially beyond said signal determining portion and comprising first and second annular conductive strips, said first annular strip being operatively connected to said first conductive strip by means of a third conductive strip and said second annular strip being operably connected to said second conductive strip, means mounted on said turret to individually contact each of said resistive strips at a variable location thereon and effective, when said resistive strips are energized,





to produce a tuning signal thereon, the magnitude of which is determined by said location, means situated on said support in alignment with said coupling portion, adapted to be operatively connected to an energization source, and effective to electrically connect said coupling portion to said source so as to energize said strips, and means on said support aligned with said contact means and effective to electrically engage a selected one of said individual strip contacting means to obtain said tuning signal therefrom, said one individual strip contacting means being selected in accordance with the rotational position of said turret.

4,027,276
TRANSMITTER FOR A CODED ELECTRONIC SECURITY SYSTEM

Frank J. Shaughnessy, Hartford, Conn., assignor to The Stanley Works, New Britain, Conn.

Filed July 31, 1975, Ser. No. 600,891
Int. Cl.[2] H04B 1/04; G08B 19/00
U.S. Cl. 325—141 4 Claims

1. A transmitter, usable in a security system responsive to an alarm activating event which includes a receiver capable of receiving signals from a plurality of similar transmitters, identifying the transmitter associated with each received signal in accordance with a selected pulse repetition frequency of the signal, and verifying the authenticity of each received signal in accordance with a predetermined transmission duration and transmission repetition frequency of the signal, comprising:

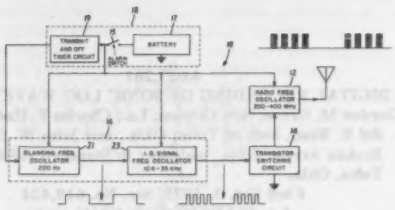
a. an RF oscillator;

b. switching means for selectively turning the RF oscillator on and off;

c. modulation source means for controlling said switching means, said modulation source means comprising:

1. a first oscillator comprising an astable multivibrator for supplying output pulses having said predetermined transmission duration at said predetermined transmission frequency; and

2. a second oscillator comprising an astable multivibrator,



responsive to the output pulses of said first multivibrator, and for supplying output pulses at said selected pulse repetition frequency; and

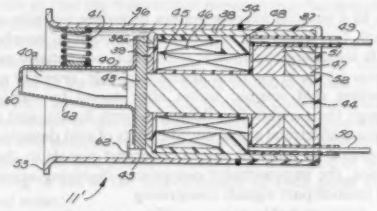
d. means for activating said modulation source means, said activating means including a power supply and control means for applying the voltage from said power supply to said modulation source means for a selected time after the occurrence of the alarm activating event.

4,027,277

VACUUM RELAY WITH REDUCED SENSITIVITY TO MANUFACTURING TOLERANCES AND OPTIONAL LATCHING FEATURE

Joseph E. Oeschger, Palo Alto, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed July 14, 1975, Ser. No. 595,435
Int. Cl.² H01H 1/66
U.S. Cl. 335—151 **11 Claims**



1. A relay comprising:

an axially elongated enclosure having a longitudinally extending axis and including at least one internally disposed fixed contact and a first external terminal conductively connected to said contact, said enclosure having a flexible conductive diaphragm at one end thereof;

a conductive switching rod member passing through said diaphragm generally normal to the plane thereof and being mechanically and electrically connected thereto, said rod member extending externally and also generally axially within said enclosure, said rod member providing switching action in cooperation with said fixed contact as a function of variation of the angular position of said rod member with respect to said axis of said enclosure;

an actuator device connected to the portion of said rod member external to said enclosure to control said angular position of said rod member to effect switching action between said rod member and said fixed contact;

means within said actuator including at least a first electromagnet, a clapper of magnetic material arranged to assume a predetermined magnetically induced first position in response to energization of said first electromagnet, a mechanical linkage arranged for transferring motion of said clapper to angular motion of said rod member substantially about the point of passage of said rod member through said diaphragm as a fulcrum;

first resilient means associated with said mechanical linkage for maintaining a residual resilient force retaining said rod member in a first position with respect to said fixed contact while said clapper is in said first magnetically induced position;

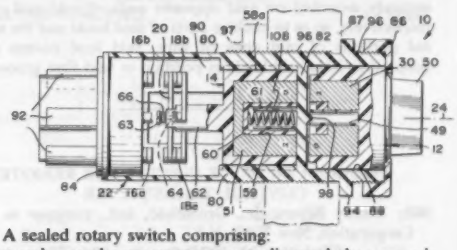
and second resilient means associated with said mechanical linkage for maintaining a residual resilient force retaining said rod member in a second position with respect to said fixed contact while said clapper is in a second position corresponding to deenergization of said electromagnet, said second resilient means also serving to separate said clapper from the pole piece of said electromagnet.

4,027,278

SEALED PERMANENT MAGNET SWITCH

Gabriel M. Giannini, 79-811 Avenue 54, Indio, Calif. 92201

Filed May 27, 1975, Ser. No. 591,015
Int. Cl.² H01H 1/66
U.S. Cl. 335—154 **18 Claims**



1. A sealed rotary switch comprising:

first and second permanent magnets disposed along an axis with pole faces in spaced-apart opposed relationship; a housing sealingly enclosing the second permanent magnet and having a nonmagnetic wall interposed between the mating pole faces of the first and second magnets; a first pair of spaced-apart contacts sealed within the housing with electrical connection through the housing; a bar sealed within the housing; a second pair of contacts mounted on the bar in spaced-apart relationship for selective respective engagement with the first pair of contacts, the second pair of contacts being electrically interconnected; and a spring connected to provide resilient coupling between the second magnet and the bar at a point therealong midway between the second pair of contacts; the second magnet being movable to position the bar to selectively open and close the set of electrical contacts in response to predetermined motion of the first magnet and the spring being coupled to exert a force on the bar when the first and second pairs of contacts are closed which force tends to maintain said contacts in a closed relationship notwithstanding motion of the second magnet.

4,027,279

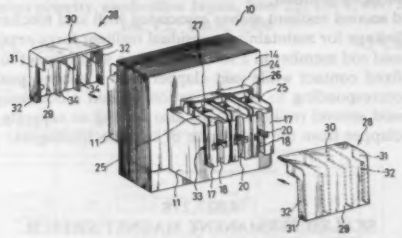
DEVICE FOR ATTACHING LEADS TO A TRANSFORMER OR THE LIKE

Katsumi Shigehara, 1729, Kashiwagaya Ebina, Kanagawa, Japan

Filed July 15, 1976, Ser. No. 705,675
Claims priority, application Japan, July 21, 1975, 50-88400
Int. Cl.² H01F 15/10
U.S. Cl. 336—90 **6 Claims**

1. In a transformer having multiturn coils of wire, the combination comprising a coil cover of electrically insulating material enclosing said coils of wire, a plurality of leads each including a conductor having an insulating covering thereon, said conductors of said leads being connected to the respective terminal portions of said coils of wire led out of said coil

cover, a flange on said insulating covering of each said lead, lug means formed on two opposite ends of said coil cover, said lug means on each end of said coil cover having formed therein a plurality of first grooves in spaced side-by-side relationship for receiving parts of said leads respectively and a plurality of second grooves for receiving said flanges of said



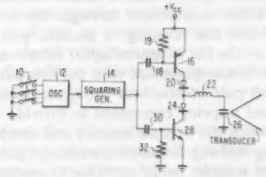
leads respectively, each second groove being arranged crosswise with one of said first grooves, and a pair of lead covers securely mounted on said opposite ends of said coil cover, respectively, so as to enclose parts of said leads and the terminal portions of said coils of wire, said lead covers being adapted to hold said leads in position in said first grooves.

4,027,280

TRANSDUCER DRIVE CIRCUIT FOR REMOTE CONTROL TRANSMITTER

Billy Wesley Beyers, Jr., Greenfield, Ind., assignor to RCA Corporation, New York, N.Y.

Filed May 23, 1975, Ser. No. 580,678
Int. Cl.² H04B *11/00*
U.S. Cl. 340—15 **8 Claims**



1. In an ultrasonic transmitter for generating ultrasonic frequency signals and having a capacitive type of output transducer, apparatus for providing signal energy to said transducer comprising:

an oscillator for generating said ultrasonic frequencies;

squaring means coupled to said oscillator for providing signals having substantially first and second voltage stages;

a first current conducting means coupled to said squaring means and responsive to signals of said first voltage state for providing current to said transducer to charge the capacitance thereof;

a second current conducting means coupled to said squaring means and responsive to signals of said second voltage state for causing current to flow from said transducer to discharge the capacitance thereof; and

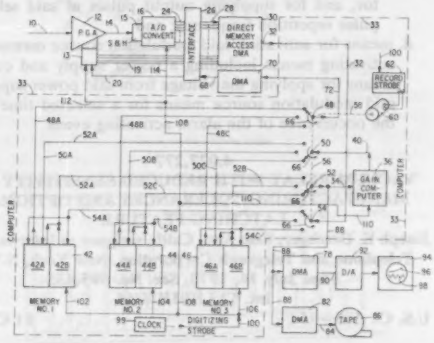
an inductor serially interposed between said transducer and said first and second current conducting means and proportioned with respect to the capacitance of said transducer to form a series tuned circuit resonant at a frequency greater than said oscillator ultrasonic frequencies so that the capacitance of said transducer reaches a maximum charge during said first voltage state.

4,027,281

DIGITAL RECORDING OF SONIC LOG WAVETRAINS

Gordon M. Greve, New Orleans, La.; Charles F. Hadley; Randol R. Read, both of Tulsa, Okla., and John W. Supernaw, Broken Arrow, Okla., assignors to Standard Oil Company, Tulsa, Okla.

Filed Oct. 3, 1975, Ser. No. 619,424
Int. Cl.² H03G *3/30;* **G01V** *1/40*
U.S. Cl. 340—15.5 GC **3 Claims**



1. In a velocity logging system including a sonde and cable means for traversing said sonde through a borehole, said sonde including transmitter means for sequentially generating seismic waves in the fluid in said borehole, receiver means for detecting said seismic waves after travel by various paths through the surrounding fluid and earth media, and means to generate electrical signal counterparts of said detected seismic waves and to transmit said counterpart signals to the ground surface, the improvement comprising digitizing apparatus for said counterpart signals comprising

a. programmable-gain amplifier means for receiving and amplifying said counterpart signals in accordance with a digital gain control signal applied to said amplifier;

b. means to digitize a selected time sample of said amplified signal;

c. means comprising at least three digital storage areas to temporarily store a digital data word including said digitized sample and a digitized value of gain of said amplifier used in digitizing said sample;

d. means to determine from said data word a new digital gain value for said amplifier to be used on the corresponding sample of a subsequent trace and means to temporarily store said new digital value or gain;

e. means to read out of storage a digital value of gain and transmit that value to said amplifier;

f. means to read out of storage said data and to reproducibly record said data on magnetic tape;

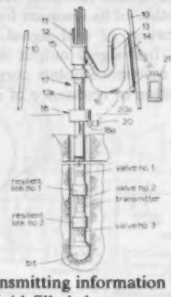
g. clock means for generating a series of control impulses to time the repeated operation of said means (*b*) through (*f*) to produce a corresponding series of data words representing a sesimic trace; and

h. switching means to use said areas in rotation for (1) the reading out of digital gain values and storing of data words, (2) the storing of digital gain values, and (3) the reading out of data words.

4,027,282
METHODS AND APPARATUS FOR TRANSMITTING INFORMATION THROUGH A PIPE STRING

John Doise Jeter, Iowa Park, Tex., assignor to Texas Dynamatics, Inc., Dallas, Tex.

Filed Oct. 18, 1974, Ser. No. 515,962
Int. Cl.² G01V 1/40
U.S. Cl. 340—18 NC 19 Claims



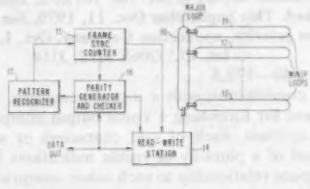
1. A method for transmitting information between opposite ends of a length of fluid filled duct comprising the steps of pumping fluid through the duct, encoding the message to be transmitted into a combination of a first code component and a second code component, generating at a first end of the duct at least one signal pressure change pulse in the fluid moving in the duct, said pressure change pulse having characteristics corresponding to said first code component, generating at said first end of the duct signal stress variations in the wall material of the duct which correspond to said second code component, detecting at a second end of the length of duct both the pressure change signals and the stress variation signals, combining the detected signals corresponding to said first and second second code components into the original code so that the transmitted message may be decoded.

4. A method of improving the identification of signal pressure pulses created in fluid at one end of a fluid filled pipe string and transmitted through the fluid in the pipe string comprising the steps of creating signal pressure pulses in the fluid in the pipe string at a first end, creating pulses consisting of stress variations in the side wall material of the pipe string at said first end detectable at a second end of the pipe string in correlation with said pressure pulses, the detection of both pulses serving to aid in the identification of each pulse over background noise.

4,027,283
RESYNCHRONIZABLE BUBBLE MEMORY

Donald T. Tang, Yorktown Heights, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Sept. 22, 1975, Ser. No. 615,638
Int. Cl.² G11C 29/00, 11/14
U.S. Cl. 340—146.1 D 10 Claims



1. A method of recovering the frame synchronization in a dynamic, non-destructive memory system of the type having a plurality of recirculating data loops and a recirculating loop used to store the parity of corresponding bits in the data loops comprising the steps of:

a. inserting a special sequence of parity pattern exhibiting a peaked autocorrelation function at the end or start of the frame in place of the normal parity in the parity loop;

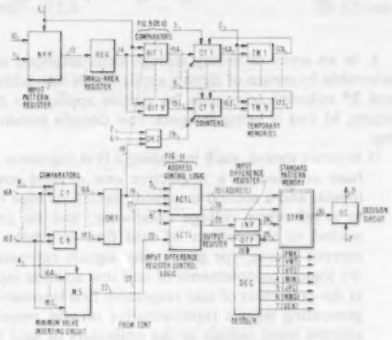
b. detecting said special sequence of parity pattern; and

c. re-establishing frame synchronization upon the detection of said special sequence of parity pattern.

4,027,284
CHARACTER RECOGNIZING SYSTEM FOR MACHINE-PRINTED CHARACTERS

Yukio Hoshino; Hideo Tsuiki; Toshio Miyazaki, and Tetsuo Miura, all of Tokyo, Japan, assignors to Nippon Electric Company, Ltd., Tokyo, Japan

Filed June 5, 1975, Ser. No. 584,228
Claims priority, application Japan, June 5, 1974, 49-64413
Int. Cl.² G06K 9/00
U.S. Cl. 340—146.3 AQ 4 Claims



1. A character recognizing system for recognizing an input pattern of a character by comparing with a plurality of standard patterns characterized in that said standard patterns are classified into a plurality of groups, each group having a common standard pattern and a plurality of non-common standard patterns, said common standard pattern of each group having a pattern arrangement in common with said standard patterns of the same group, and said non-common standard patterns of the same group representing differences between said standard patterns of the same group and said common standard pattern of the same group, and by comprising:

means for storing said common standard patterns and said non-common standard patterns;

a first comparison means for comparing said input pattern with a common standard pattern of a group to provide a first data signal representative of the difference therebetween;

a second comparison means for comparing said first data signal with a predetermined value to provide a second data signal when said first data signal is less than said predetermined value;

a third comparison means responsive to said second data signal for comparing said input pattern with the non-common standard patterns in said group to provide the sum of said first data signal and a third data signal representative of the difference between said input pattern and said non-common standard patterns; and

means responsive to said third comparision means for generating a signal proportional to a minimum sum of differences represented by said first and third data signals.

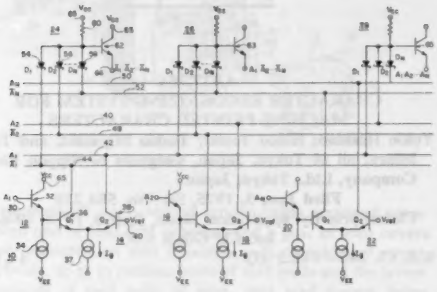
4,027,285
DECODE CIRCUITRY FOR BIPOLAR RANDOM ACCESS MEMORY

Michael S. Millhollan, Mesa, and Ronald L. Treadway, Scottsdale, both of Ariz., assignors to Motorola, Inc., Chicago, Ill.

Division of Ser. No. 428,511, Dec. 26, 1973, now Defensive Publication No. 3,914,620. This application May 2, 1975, Ser. No. 574,076

Int. Cl.[2] G11C *8/00;* **H03K** *5/20;* **H04Q** *9/00*

U.S. Cl. 340—166 R **1 Claim**



1. In an array of binary storage cells arranged as 2^N rows selectable by means of signals applied to N row address inputs and 2^M columns selectable by signals applied to M column inputs, M and N being integers, row decode means comprising:

N inverter means, each including a first transistor having its base coupled to a respective one of said row address inputs, and a second transistor having its base connected to a reference voltage conductor, and its emitterconnected to the emitter of said first transistor and to a current source, for generating signals representative of the logical complements of said row address input signals at the collectors of said respective first transistors and for generating signals representative of said respective row address input signals at the collectors of said respective second transistors;

2^N gate means coupled to said N inverter means for selecting a different one of said 2^N rows, each of said 2^N gate means including

a. N diodes, each having its anode connected to the anodes of the other of said diodes and to the base of an output transistor and to a load resistor, each of said output resistors having its emitter coupled to a respective one of said rows;

b. each of said diodes having its cathode coupled to one and only one of said collectors, so that signals produced at the bases of each of said output transistors represent, respectively, the 2^N combinations of said N row address signals.

4,027,286
MULTIPLEXED DATA MONITORING SYSTEM

Ronald Jon Marosko, Houston, Tex., assignor to TRW Inc., Redondo Beach, Calif.

Filed Apr. 23, 1976, Ser. No. 679,608

Int. Cl.[2] G08B *21/00;* **H04Q** *9/00*

U.S. Cl. 340—171 R **14 Claims**

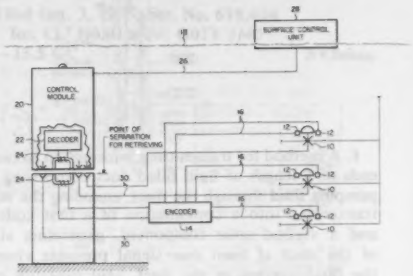
1. A method of determining the respective states of a plurality of devices having at least two stable states, comprising:

a. assigning a pair of different frequencies to each one of said devices, each pair of frequencies differing in frequency from each other and from the other pairs, there being a first frequency of each pair corresponding to one state of each of said devices and a second frequency of said pair corresponding to another state of said device;

b. generating a signal train of frequencies whose spectrum extends from a frequency below the lowest frequency assigned to said devices to a frequency above the highest frequency assigned to said devices;

c. applying said signal train to an encoder including a plurality of resonant networks equal in number to said devices and each of which has a state of resonance at one or the other frequency of said pair of frequencies assigned to said devices depending upon the state of said device;

d. providing means coupled to said resonant networks and responsive to the operation of said devices for conditioning each one of said resonant networks for operation in one or the other of its resonant frequency states whereby upon application of said signal train to said resonant networks, a first signal output is obtaining including a plurality of resonance points corresponding respectively to the condition of resonance of said networks;



e. applying said signal train to a reference network including a plurality of resonant circuits equal in number to said resonant networks, each of said reference resonant circuits being assigned to a corresponding one of said resonant networks of said plurality and having a resonance frequency that is between the two different frequencies of said pair, whereby to obtain a second signal output including a plurality of resonance points corresponding respectively to the resonant frequencies of said reference network;

f. comparing the relative phase of said first and second signal outputs to determine the relative occurrences of the resonance points of said encoder resonant networks and said reference resonant circuits; and

g. deriving a digital output based upon the results of the comparison made in (*f*).

4,027,287
STORAGE-CONTROLLED OUTPUT DEVICE

Gerhard Dirks, Los Altos Hills, Calif., assignor to Hale Bros. Associates, San Francisco, Calif.

Continuation of Ser. No. 811,744, April 1, 1969, which is a division of Ser. No. 482,075, Aug. 24, 1965, Pat. No. 3,448,214, which is a division of Ser. No. 65,440, Oct. 27, 1960, Pat. No. 3,205,483, which is a division of Ser. No. 498,041, March 30, 1955, Pat. No. 2,972,016, which is a continuation-in-part of Ser. No. 101,032, June 24, 1949, abandoned. This application Dec. 11, 1970, Ser. No. 597,333

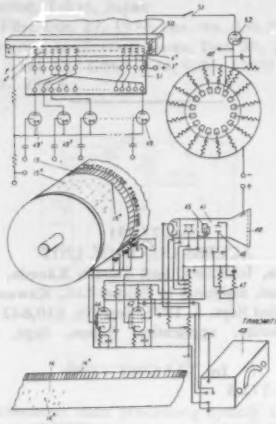
Claims priority, application Germany, Oct. 1, 1948, 11464

Int. Cl.[2] G06F *3/12, 3/14*

U.S. Cl. 340—172.5 **15 Claims**

1. In combination with a digital computer, an output arrangement for furnishing a visual output comprising characters or symbols, each of said characters or symbols being composed of a plurality of visible indications in a predetermined space relationship to each other, comprising, in combination, data storage means for furnishing input signals comprising a synchronizing signal and, in a predetermined timed relationship therewith, a timed series of data input signals, each of said data input signals having a first and a second level,

a data input signal having said second level representing an indication; cathode ray beam generating mean; means for varying the intensity of said cathode ray beam to correspond to the level of said input signals, said cathode ray beam thus having a first and a second intensity level; beam-responsive means having a plurality of beam-responsive areas, each of



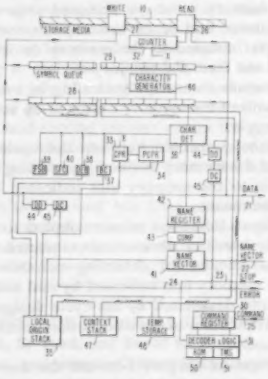
said beam-responsive areas being adapted to assume a first or a second state in response to the intensity level of the beam when impinging thereon, a visible indication being furnished by each beam-responsive area in a second state; and deflecting means for deflecting said beam over said beam-responsive area in a predetermined sequence in response to said synchronizing signal.

4,027,288

SELF-MANAGING VARIABLE FIELD STORAGE SYSTEM FOR HANDLING NESTED DATA STRUCTURES

Robert Stanley Barton, La Jolla, and Gary Wesley Hodgman, Encinitas, both of Calif., assignors to Burroughs Corporation, Detroit, Mich.

Filed Feb. 9, 1976, Ser. No. 656,280
Int. Cl.² G06F 7/22
U.S. Cl. 340—172.5 **13 Claims**



1. A variable field storage system for storing variable length data field segments, each of which starts with a beginning delimiter character and ends with an ending delimiter character, said system being capable of containing free space between said segments, said system comprising:

a serial periodic storage media;

an input device coupled to said storage media;

an output device coupled to said storage media;

an input/output data bus;

an access shift register means coupled to said input device and said output device and to said input/output data bus to receive data segments from said data bus for transmission to said input device and to receive data segments from said output device for transmission to said data bus; and

a queue shift register means coupled to said input device and said output device to receive from said output device data segments that are to be temporarily retained to provide storage space for new data segments that are supplied to said input device from said access shift register when free storage space is available between stored segments.

4,027,289

OPERATING CONDITION DATA SYSTEM

Donald J. Toman, 24 Old Farm Road, Pleasantville, N.Y. 10570

Filed June 26, 1975, Ser. No. 590,406
Int. Cl.² G06F *15/48*, *15/50*
U.S. Cl. 340—172.5 **26 Claims**

1. A data system for a plurality of navigation aid transmitters comprising

a separate operating condition data measurement sub-system for each of said transmitters,

each of said sub-systems including a separate data reading means and local data storage means,

said data reading means

including a mulitplex switch means connected to the associated transmitter for taking a plurality of operating condition measurements in squence in the form of analog voltage signals,

an analog to digital converter for converting said analog signals to digital signals,

said local data storage means being connected to said analog to digital converter for storing said set of conditions measurement,

each of said sub-systems being operable to store a set of condition measurements comprising at least one complete sequence of said condition measurements,

said data storage means being operable after storage of said complete set of condition measurements to continue to receive new condition measurements in sequence and to store said new condition measurements in place of corresponding condition measurements previously stored in a prior sequence so that said stored condition measurement are constantly up-dated in said local data storage means,

each sub-system also including a radio signal monitoring

receiver means arranged and positioned to monitor at least one signal from the associated radio transmitter,

said monitor being connected to disable said transmitter by emitting a monitor alarm condition signal,

said monitor including means for emitting a monitor alarm condition signal when at least one monitored signal from said transmitter departs from predetermined acceptable limits,

a connection from said monitor to said data reading means operable to disable said data storage means under said monitor alarm condition to thereby preserve said updated condition measurements stored in said data storage means indicating the operating conditions at the time of said monitor alarm condition,

means for receiving and collectively storing digital signals from each of said local data storage means for each of a plurality of said sub-systems,

data transmission channel means connected from said subsystems to said digital signal receiving and collective storing means,

a central station operable for communication with said digital signal receiving and collective storing means,

a communication channel means connected for providing communication from said digital signal receiving and collective storing means to said central station,

said central station including data storage means for receiving data transmitted from said collective data storage means.

4,027,290

PERIPHERALS INTERRUPT CONTROL UNIT

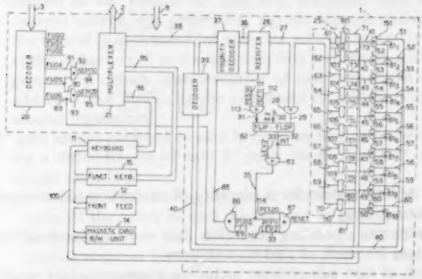
Angelo Subrizi, and Ettore Violino, both of Ivrea (Turin), Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy

Filed June 7, 1974, Ser. No. 477,467

Claims priority, application Italy, June 12, 1973, 25092/73

Int. Cl.² G06F *3/04, 9/18*

U.S. Cl. 340—172.5 **2 Claims**



1. A peripheral interrupt control unit for selectively providing interrupt signals from a plurality of peripheral units to a central processing unit of the type capable of executing a program stored in a memory, said interrupt signals being sent to said central processing unit in an order determined by the priority of the peripheral unit requesting an interrupt, said interrupt control unit comprising:

an interrupt register having a plurality of cells, ecah of said cells storing an associated interrupt request signal generated by one of said peripheral units;

means for storing in said cells and interrupt request signals;

a single priority decoder connected with the output of said interrupt register for selecting one of said interrupt request signals according to a predetermined priority order to be transmitted to said central processing unit and for generating a code combination of signals associated with said selected interrupt request signal;

means for transmitting said code combination of signals to said central processing unit; and

clearing means connected between the output of said priority decoder means and said interrupt register and enabled by an end signal generated by said central processing unit, said clearing means including a decoder means responsive to said generated code combination for clearing the cell storing the interrupt request signal selected by said decoder means of said clearing means.

4,027,291

ACCESS CONTROL UNIT

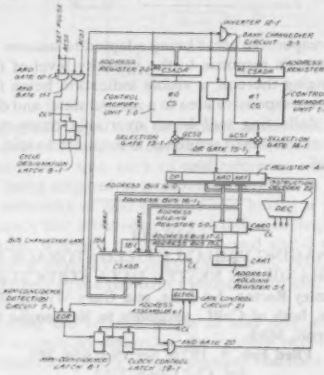
Koichi Tokura, Ichikawa, and Saburo Kaneda, Yokohama, both of Japan, assignors to Fujitsu Ltd., Kawasaki, Japan

Filed Sept. 5, 1975, Ser. No. 610,642

Claims priority, application Japan, Sept. 12, 1974, 49-105367

Int. Cl.² G06F *13/00*

U.S. Cl. 340—172.5 **6 Claims**



1. An access control unit for controlling a memory device having a plurality of memory units for storing data in a manner whereby the memory units are accessed sequentially in an interleaved manner, said access control unit comprising

a data register coupled to the memory device for storing data read out from the memory device;

cycle designation means for indicating in every cycle the memory unit of the memory device to be accessed in the relevant cycle;

address means connected between the cycle designation means and the memory device for providing in each cycle an address to the memory unit indicated by the cycle designation means;

non-coincidence detection means coupled to the memory unit of the memory device and connected to the cycle designation means for detecting non-coincidence between the memory unit indicated by said address and the memory unit designated by the cycle designation means upon determination of the distribution destination of that address; and

invalidating means coupled between the non-coincidence detection means and the data reqister and utilizing the output of said non-coincidence detection means for invalidating data read out from the memory device in a cycle n cycles after that in which non-coincidence is detected, wherein n is the number of memory units interleaved.

4,027,292

SYNCHRONOUS DATA PROCESSING SYSTEM HAVING ARITHMETIC AND CONTROL UNITS CONTROLLED BY SINGLE-PHASE CLOCK PULSES

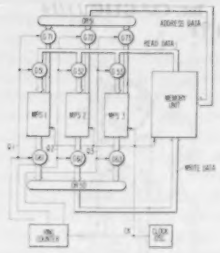
Kiyokazu Okamoto; Masayoshi Isomura, and Atsuto Kobayashi, all of Tokyo, Japan, assignors to Nippon Electric Company, Limited, Tokyo, Japan

Filed Dec. 27, 1974, Ser. No. 536,779

Claims priority, application Japan, Dec. 29, 1973, 49-1116

Int. Cl.[2] G06F *7/38, 9/06, 13/00*

U.S. Cl. 340—172.5 4 Claims



1. A synchronous data processing system comprising an arithmetic unit and a control unit each of which is controlled by single-phase clock pulses, said arithmetic unit and said control unit being in the form of first and second closed data paths, respectively, wherein said arithmetic unit comprises:

first bus lines for transferring data,

first register means used as a data register having a single stage for storing data transferred by said first bus lines, and

first logic circuits; said first bus lines, said first register means and said first logic circuits being connected in said first closed data path, said first logic circuits being responsive to first control signals to cause the data to be stored in a selected part of said first register means according to the data supplied from said first bus lines during one cycle of a single-phase clock pulse,

wherein said control units comprises:

second bus lines for transferring data,

second register means used as an address register having a single stage for storing data transferred by said second bus lines,

second logic circuits; said second bus lines, said second data register means and said second logic circuits being connected in said second closed data path, said second logic circuits being responsive to second control signals to cause data to be stored in said second register means according to the data supplied by said second bus lines during one cycle of a single-phase clock pulse, and

control signal generating means connected to receive an output of said second register means for generating said first and second control signals as a predetermined response to coded output data from said second register means,

and wherein said second bus lines are connected to said arithmetic unit to form a third closed data path including said second register means and said first logic circuits to exchange data between said arithmetic and control units.

4,027,293

MICROCODE PROGRAM SEQUENCER

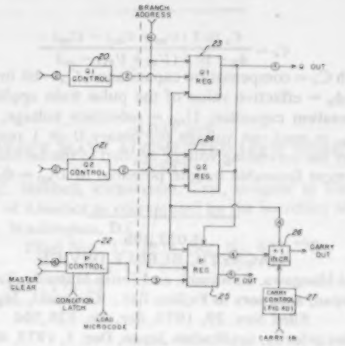
Neil R. Lincoln, St. Paul, and David R. Resnick, Arden Hills, both of Minn., assignors to Control Data Corporation, Minneapolis, Minn.

Filed Sept. 12, 1975, Ser. No. 612,837

Int. Cl.[2] G06F *9/16*

U.S. Cl. 340—172.5 13 Claims

1. A microcode program sequencer for controlling computer operations in a computer having a microcode memory, comprising, in combination: a first register means having a first input and an output; means connecting said first input of said first register means to said microcode memory to receive address signals from said microcode memory; a first control means connected to said first register means and to said microcode memory and responsive to an instruction signal from said microcode memory for selectively providing a plurality of control signals to said first register means; a second register means having a first and a second input and an output; means connecting said first input of said second register means to said microcode memory to receive said address signals from said microcode memory; means connecting said second input of said second register means to said output of said first register means; a second control means connected to said second



register means and to said microcode memory and responsive to an instruction signal from said microcode memory for selectively providing a plurality of control signals to said second register means; each of said first and second register means including

first means responsive to a first control signal from the respective control means for enabling said register means to accept and store address from said microcode memory, and

second means responsive to a second control signal from the respective control means for enabling said register means to provide address signals at its first-named output representative of the address stored therein;

and means connecting said output of said second register means to said microcode memory.

4,027,294

COMPENSATION ELEMENT FOR DYNAMIC SEMICONDUCTOR STORES, AND METHOD OF OPERATING THE SAME

Guenther Meusburger, and Gottfried Wotruba, both of Munich, Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Aug. 25, 1975, Ser. No. 607,196

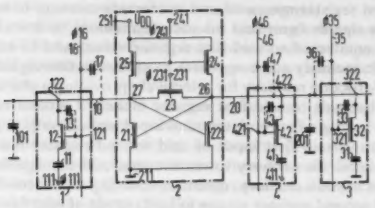
Claims priority, application Germany, Aug. 28, 1974, 2441243

Int. Cl.[2] G11C *7/06*

U.S. Cl. 340—173 CA 4 Claims

1. A compensation storage element for dynamic semiconductor stores in which a main storage element is operatively connected to a word line and a bit line, and an evaluation circuit is operatively connected to the bit line by means of which the storage element may be read out, comprising a compensation capacitor, having one side thereof connected to the bit line at the opposite side of the evaluation circuit to which the storage element is connected, means including a compensation-selector line operatively connected to the other side of the compensation capacitor for controlling the applica-

tion of a selector pulse train thereto, the compensation capacitor being dimensioned in accordance with the following equation:



$$C_C = \frac{C_A\,[0.5\,(U_{B0} + U_{B1}) - U_{ref}]}{\phi_N - [0.5\,(U_{B0} + U_{B1}) - U_{ref}]}$$

in which C_C = compensation capacitance, C_A = bit line capacitance, ϕ_N = effective value of the pulse train applied to the compensation capacitor, U_{ref} = reference voltage, and U_{B0} and U_{B1} = read out voltage for binary 0 or 1 respectively, whereby the correcting voltage applied to the bit line is raised to the most favorable middle potential of $U_{BD} = 0.5\,(U_{B0} + U_{B1})$.

4,027,295

MAGNETIC BUBBLE DEVICE

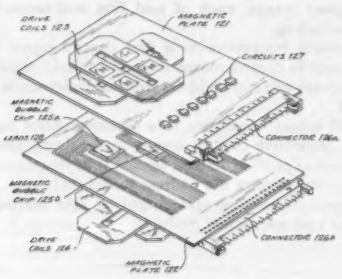
Harumi Maegawa, Kawasaki, and Junzo Matsuda, Tokyo, both of Japan, assignors to Fujitsu Ltd., Kawasaki, Japan

Filed Nov. 29, 1974, Ser. No. 528,504

Claims priority, application Japan, Dec. 1, 1973, 48-135523

Int. Cl.² G11C *19/08*

U.S. Cl. 340—174 TF **2 Claims**



1. A magnetic bubble device having a plurality of magnetic bubble chips each consisting of magnetic material for producing a magnetic bubble under the effect of a bias magnetic field, each of said magnetic bubble chips having a surface, said magnetic bubble device comprising,

a plurality of drive coils for producing a rotating magnetic field substantially parallel to the surfaces of the magnetic bubble chips, said plurality of drive coils including a flat faced coil consisting of electrically conductive material having flat windings, said flat faced coil producing a magnetic field substantially in its own plane, each of the magnetic bubble chips being positioned in a corresponding one of a plurality of areas where each direction of rotation of the magnetic field produced by the drive coils and acting on the magnetic bubble chip is different, selected ones of the magnetic bubble chips being positioned in areas where the rotating magnetic field acts clockwise and selected others of the magnetic bubble chips being positioned in areas where the rotating magnetic field acts counterclockwise, said ones of the magnetic bubble chips and said others of the magnetic bubble chips being in juxtaposition whereby the magnetic bubble produced by each of the magnetic bubble chips is shiftable in a positive direction.

4,027,296

MAGNETIC PLATE COMPRISING DRIVABLE DOMAINS

Jaap van Suchtelen, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

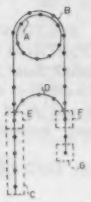
Continuation of Ser. No. 390,592, Aug. 22, 1973, abandoned.

This application Dec. 12, 1974, Ser. No. 532,260

Claims priority, application Netherlands, Sept. 2, 1972, 7212008

Int. Cl.² G11C *11/14*

U.S. Cl. 340—174 TF **10 Claims**



1. A device for propagating magnetic bubble domains in a single, substantially homogeneous layer of magnetic material, said layer comprising a first domain path having a shape of a continuous pattern, said layer further comprising a second domain path comprising a sequence of first and second portions, said second portion having a shape of a continuous pattern, external means for driving a plurality of domains along said first portion, said domains driving each other in sequence along said second portion, said second portion furthermore comprising a sequence of a converying section and a diverging section with said first domain path, said first domain path having a third portion located adjacent to and coextensice with part of said second portion between said coverging and diverging sections thereof and extending a distance sufficient to include at least two of said driven domains, said two domains in the part of said second portion constituting a means for constraining there between a domain in said third portion of said first path equal distant from said two domains in said part of said second portion and for driving said domains in said third portion while maintaining said equal-distant relationship.

4,027,297

GAPLESS MAGNETIC BUBBLE PROPAGATION PATH STRUCTURE

David Carl Bullock, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Feb. 3, 1975, Ser. No. 546,640

Int. Cl.² G11C *11/14*

U.S. Cl. 340—174 TF **4 Claims**

1. In a magnetic bubble domain system including a substrate of mono-crystalline non-magnetic material, an epitaxial layer of magnetic material disposed on said substrate and in which magnetic bubble domains can be propagated, and a magnetizable overlay pattern on one surface of said layer and having a magnetization in the plane of said overlay pattern for defining propagation paths for magnetic bubble domains, wherein

said magnetizable overlay pattern comprises respective chains of spaced bar elements arranged in an alternating sequence with respective chains of spaced H-elements,

said H-elements being disposed on their sides so as to arrange the respective cross-arms thereof in substantially

parallel relationship to the bar elements included in the respective chains of bar elements,

the upper arm of each of said H-elements engaging a respective bar element at an end portion thereof and engaging the next successive bar element in the same chain at a location intermediate the ends thereof,

the lower arm of each of said H-elements engaging a respective bar element at a location intermediate the ends thereof and engaging the next successive bar element in the same chain at an end portion thereof.

the upper and lower arms of said H-elements in the same chain thereof being in engagement with bar elements of different chains of bar elements,

means for providing an in-plane rotating magnetic field within the plane of said magnetic layer and said magnetizable overlay pattern disposed thereon, and

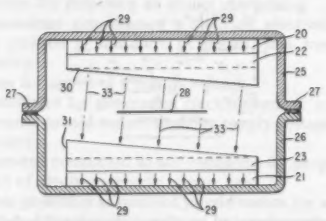
means associated with each of said H-elements controlling movement of a magnetic bubble domain along a continuous track of magnetizable material, with said means defining a selected bubble propagation path comprising further magnetizable elements included in said magnetizable overlay pattern, said further magnetizable elements being diagonal members respectively corresponding to each of said H-elements, each said diagonal member extending from one end of the upper arm to the outer end of the lower arm and intersecting the cross-arm of the corresponding H-element.

4,027,298

MAGNETIC BUBBLE MEMORY BIAS MAGNET ARRANGEMENT

Paul Charles Michaelis, Watchung, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Nov. 5, 1975, Ser. No. 629,006
Int. Cl.² G11C *11/14*
U.S. Cl. 340—174 TF **8 Claims**



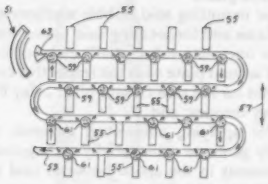
1. A magnetic bubble memory comprising a jlayer of material in which magnetic bubbles characterized by a magnetization in a first direction can be moved in the presence of a magnetic bias field antiparallel to that first direction, said memory also comprising bias magnet means for providing said bias field, said bias magnet means comprising first and second permanent magnet elements each having a broad face and being magnetized normal to said face, said bias magnet means also including first and second magnetically soft keeper elements, said first bias magnet and keeper elements and said second bias magnet and keeper elements being arranged to form first and second composite structures respectively, and means for fixing said first and second composite structures in spaced-apart positions with said broad faces in parallel planes, said composite structures being of wedge configuration for directing said bias field at an angle to said broad faces to provide a component field parallel to said broad faces in a plane therebetween, said layer being disposed in said plane.

4,027,299

SURFACE WAVE AUGMENTED LOOP MEMORY SYSTEM

Wayne C. Hubbell, Richardson, Tex., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Nov. 12, 1975, Ser. No. 631,278
Int. Cl.² G11C *11/14*
U.S. Cl. 340—174 TF **1 Claim**



1. A propagating magnetic domain memory system comprising:

a. a first acoustic waveguide;

b. a first plurality of magnetic bars on opposite sides of the first acoustic waveguide with the bars on one side being interleaved with the bars on the other side;

c. a first surface wave transducer at one extreme of the first acoustic waveguide for generating pulsed acoustic waves therein;

d. a second acoustic waveguide being positioned to propagate magnetic domains in a direction perpendicular to that of the first acoustic waveguide and with selected points of the second acoustic waveguide being in juxtaposition with selected points of the first acoustic waveguide;

e. a second plurality of magnetic bars on opposite sides of the second acoustic waveguide with the bars on one side being interleaved with the bars on the other side;

f. a second surface wave transducer at one extreme of the second acoustic waveguide for generating pulsed acoustic waves therein;

g. means for generating an alternating magnetic field in the plane of the first and second acoustic waveguides where the field is parallel to the propagating direction of one acoustic waveguide and perpendicular to the other acoustic waveguide;

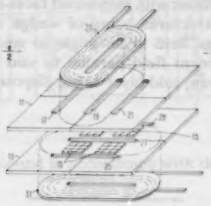
h. a plurality of current actuated transfer gates at the selected points of juxtaposition of the first and second acoustic waveguides.

4,027,300

BUBBLE MEMORY PACKAGE

Roland Joseph Braun, Vestal, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed May 24, 1976, Ser. No. 689,278
Int. Cl.² G11C *11/155*
U.S. Cl. 340—174 TF **13 Claims**



1. A modular subassembly for field accessed bubble memory devices comprising:

at least one level of bubble memory devices;

first and second electrically and thermally conductive reflection plates, each of said plates including a plurality of elongated parallel slots therein;

first and second field coils adapted to generate first and second magnetic fields, respectively, associated with said first and second reflection plates, each coil oriented so that the magnetic field generated thereby is operative to pass through the elongated parallel slots in its respective reflection plate;

means for mounting said bubble memory devices between said plates and for locating said plates with the elongated slots in one plate substantially perpendicular to the slots in said second plate with the respective coils of each plate mounted on the side of said plate away from said bubble memory devices; and,

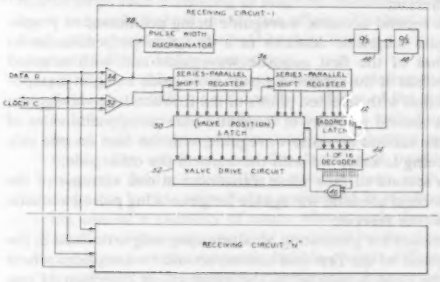
means for applying alternating currents to said coils to thereby generate substantially orthogonal magnetic field components in the space between said reflection plates containing said bubble memory devices.

4,027,301

SYSTEM FOR SERIALLY TRANSMITTING PARALLEL DIGITAL DATA

Robert Mayer, Ardmore, Pa., assignor to Sun Oil Company of Pennsylvania, Philadelphia, Pa.

Filed Apr. 21, 1975, Ser. No. 570,298
Int. Cl.² H04Q *11/00*
U.S. Cl. 340—183 **8 Claims**



1. A system for converting a plurality of digital words, each of which has its bits available simultaneously as parallel data, to a plurality of digital words, each of which has its bits available in series as serial data, and then reconverting the serial digital words back to parallel digital words, and comprising:

a. a digital clock for producing clock pulses;

b. a plurality of parallel to series shift registers, and including one parallel to series shift register for each of the plurality of digital words;

c. means fo entering each parallel digital word into the parallel to series shift register provided for that word;

d. means for entering a separate digital code into each parallel to series shift register, whereby each separate digital code identifies a particular digital word;

e. means for serially stepping out the digital word and digital code in each shift register;

f. a plurality of gating means, one coupled to the output of each parallel to series shift register, for gating the output of the shift register when activated;

g. means for activating each of said plurality of gating means in sequence and one at a time to allow each digital work and code to be gated out serially one at a time and in sequence;

h. means for producing a strobe timing pulse for each of said gated out serial digital words and codes, which strobe pulse has a duration different from a clock pulse produced by said digital clock; and

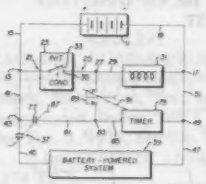
i. means for receiving the serial digital words and codes stepped out by said stepping means and said strobe timing pulses and including a plurality of series to parallel shift registers, each of which is associated with a separate one of the digital codes, means for entering each received serial digital work into every one of said plurality of series to parallel shift registers, means for determining if the received digital code matches the code associated with each series to parallel shift register, pulse width discriminator means, timed by said strobe timing pulse, to signal that the serial word has been entered into every one of said plurality of series to parallel shift registers, and means, responsive to said pulse width discriminator means, for utilizing the parallel digital word in each series to parallel shift register if the code of the received digital word matches the code associated with the particular series to parallel shift register.

4,027,302

DOUBLE DETECTION CIRCUIT FOR CONSERVING ENERGY IN FIRE DETECTION SYSTEMS AND THE LIKE

William E. Healey; Morse R. Heineman, both of Bloomfield Hills, and Ricky M. Erlich, Southfield, all of Mich., assignors to W. E. Healey & Associates, Inc., Bloomfield Hills, Mich.

Filed June 3, 1976, Ser. No. 692,584
Int. Cl.² G08B *17/00*
U.S. Cl. 340—227 R **15 Claims**



1. A battery-operated, energy-conserving fire detector system comprising:

a relatively sensitive, passive fire detection element requiring no system power for operation and responsive to the detection of a predetermined condition indicative of combustion in a protected area for closing a normally-opened electrical path between its input and its output;

a D.C. storage battery for supplying system power having

one terminal coupled to the input of said passive fire detection element;

relay means coupling the output of said passive fire detection element to the opposite terminal of said battery to form a first circuit loop; said relay means being energized in response to the passage of current therethrough when said passive element closes said path to complete said first circuit loop;

a non-passive, highly reliable, battery-powered fire detection means for more accurately monitoring said area to be protected for at least one, predetermined condition indicative of combustion within said protected area and responsive to the detection of said at least one predetermined indicative condition for generating a verification signal indicative thereof;

a battery-powered, action-initiating means coupled to said non-passive fire detection means and responsive to the generation of said verification signal for electrically initiating a predetermined positive corrective action;

conductive means coupling said non-passive fire detection means into a second circuit loop with said battery; and

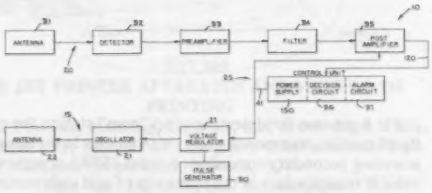
a first normally-opened relay-operated switch interposed in said second circuit loop and responsive to the energization of said relay means for closing its contacts to complete said second circuit loop and supply power to said non-passive fire detection means and responsive to the de-energization of said relay means for opening its contacts to break said second circuit loop and cut off the flow of power to said non-passive fire detection means such that said battery is only connected to the energy-consuming, non-passive fire detection means after an initial detection by said passive element thereby conserving energy and prolonging the life of the battery.

4,027,303

APPARATUS FOR DETECTING THE PRESENCE OF OBJECTS BY SENSING REFLECTED ENERGY

Karl R. Neuwirth, 736 Chemowa Court, Sunnyvale, Calif. 94087, and Malcolm E. Milligan, 1250 Schneider Road, North Canton, Ohio 44720

Filed May 22, 1975, Ser. No. 579,959
Int. Cl.² G01S 9/02; G08B 13/24
U.S. Cl. 340—258 D **7 Claims**



1. Apparatus for detecting an object comprising:

A. a transmitter propagating a field of electromagnetic energy emitted in the form of pulses, said transmitter comprising:

a. means for applying a supply voltage,

b. an oscillator for generating electromagnetic energy in responnse to said means applying supply voltage to said oscillator,

c. an antenna connected to said oscillator for propagating a field of electromagnetic energy, and

d. a pulse generator connected to said means for applying supply voltage to said oscillator at a pulse rate for the emission of the field of electromagnetic energy in the form of pulses, said pulse generator including a piezoelectric resonator for selecting the pulse rate at which said transmitter emits the field of electromagnetic energy;

B. a receiver detecting the level of electromagnetic energy influenced by an object in the path of said field of electromagnetic energy for providing a level of pulse energy, said receiver comprising:

a. a detector for removing pulse energy from the electromagnetic energy influenced by the object in said field,

b. a filter for passing only the pulse energy of a predetermined frequency, said filter including a piezoelectric resonator for selecting said predetermined frequency said predetermined frequency passed by said filter being the same as said pulse rate at which said transmitter emits the field of electromagnetic energy, and

c. an amplifier connected to said filter for providing a voltage representative of said level of pulse energy;

C. a control circuit connected to said amplifier of said receiver for producing an alarm-activating signal in response to said voltage reaching a predetermined magnitude; and

D. an alarm circuit connected to said control circuit and activated by said control circuit producing the alarm-activating signal.

4,027,304

ALARM AND SAFETY CAPSULE

Tony Diakantonis, Woodcrest Gardens D-12, Mahopac, N.Y. 10541, and Warren L. Sweatt, 19 Covington Road, Yonkers, N.Y. 10701

Filed Apr. 19, 1976, Ser. No. 678,060
Int. Cl.² G08B 21/00
U.S. Cl. 340—304 **10 Claims**

1. An alarm and safety booth having a door and a control circuit comprising manually controllable alarm switch means including a first push button, door switch means positioned to energize said alarm switch means only in the closed position of said door, means coupled to said alarm switch means for inhibiting closing of said door when said first push button is depressed, means responsive to actuation of said alarm switch means when energized for locking said door, door opening switch means including a second push button, time delay means coupled to said door locking means for energizing said door opening switch a predetermined time after said door is locked, and means responsive to operation of said door opening switch means by depression of said second push button for unlocking said door and resetting said control circuit.

4,027,305

SYSTEM FOR DRIVING LIQUID CRYSTAL DISPLAY DEVICE

Juji Kishimoto, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 422,166, Dec. 6, 1973. This application Apr. 8, 1975, Ser. No. 566,064
Claims priority, application Japan, Aug. 9, 1973, 48-89488
Int. Cl.² G08B 5/36; G02F 1/13
U.S. Cl. 340—336 **10 Claims**

1. A system for driving a liquid crystal display device comprising in combination:

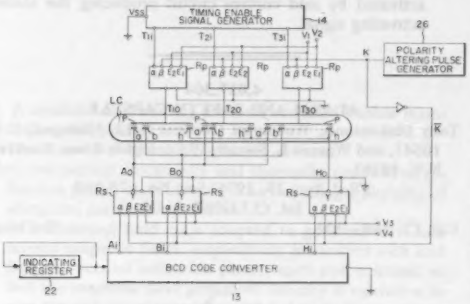
a liquid crystal display device having a plurality of liquid crystal digit display units each comprising a common electrode, a plurality of display segments opposed to and spaced from said common electrode, and a liquid crystal material interposed between said common electrode and said plurality of display segments;

means for electrically connecting corresponding ones of said display segments in each of said liquid crystal digit display units;

a timing enable signal generator for generation signals to sequentially and cyclically drive the respective said common electrodes of said liquid crystal digit display units;

a code converter for producing signals to selectively drive said display segments;

a recirculating register adapted to be recirculated in one cycle period of said timing enable signal generator for



providing numerical information to said code converter; and

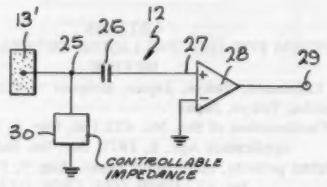
means for altering polarities of the signals from said timing enable signal generator and of the signals from said code converter every integral multiple of one recirculating period of said recirculating register, said means including a polarity alternating pulse generator, a plurality of first groups of gating means to which are supplied the signals from said polarity altering pulse generator and the signals from said timing enable signal generator and from which output signals are respectively applied to said common electrodes of said digit display units, and a plurality of second groups of gating means to which are supplied the signals from said polarity altering pulse generator and the signals from said code converter and from which output signals are respectively applied to said display segments of said digit display units.

4,027,306

TOUCH-RESPONSIVE CIRCUIT AND DATA INPUT TERMINAL USING SAME

Richard Hackmeister, 1239 N. Sweetzer, West Hollywood, Calif. 90069

Filed Apr. 5, 1976, Ser. No. 673,646
Int. Cl.² G08C 1/00
U.S. Cl. 340—365 C **16 Claims**



1. A touch-responsive circuit, comprising:

an ohmic contact,

an amplifier having a high impedance input,

a dc blocking capacitor, said contact being connected via said capacitor to said amplifier high impedance input, so that a small voltage induced by touching said contact will be supplied to said amplifier causing production of an amplifier output signal indicative of touch actuation, and

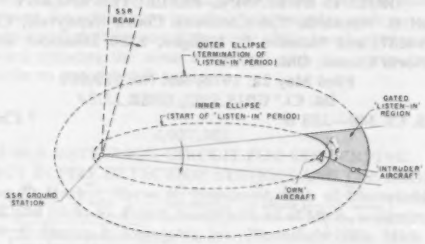
a controllable impedance element connected to said contact and selectively controlled to permit or prevent said induced voltage from being supplied to said amplifier depending on the effective impedance of said element, control of said element thereby selectively enabling output signal actuation by human touching of the associated ohmic contact.

4,027,307

COLLISION AVOIDANCE/PROXIMITY WARNING SYSTEM USING SECONDARY RADAR

George B. Litchford, Northport, N.Y., assignor to Litchstreet Co., Northport, N.Y.

Continuation of Ser. No. 317,810, Dec. 22, 1972, abandoned.
This application May 9, 1975, Ser. No. 576,143
Int. Cl.² G01S 9/56
U.S. Cl. 343—6.5 LC **51 Claims**



51. A process for detecting at an "own" station the proximity of mobile, transponder-carrying vehicles in an azimuthally scanning secondary surviellance radar (SSR) system wherein vehicle transponders in the proximity of said own station reply to interrogations transmitted in a narrow, rotating beam of at least one ground station remote from said own station and said vehicle transponders, said process comprising the steps of:

a. receiving transponder replies to an interrogation at said own station during a predetermined period following the time that said interrogation would be received if said beam were directed toward said own station;

b. determining the angle of incidence of said transponder replies received during said predetermined period;

c. determining the angle of incidence of interrogations transmitted by a ground station;

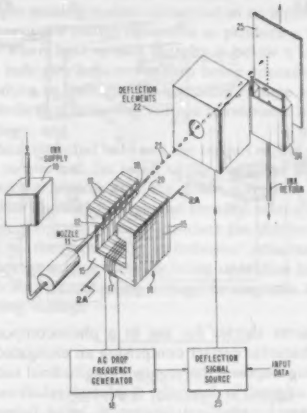
d. determining the difference (T_D) between the time that an interrogation would be received if the beam of said ground station were directed toward the place of receipt at said own station of said transponder replies and the time of receipt of a transponder reply to that interrogation; and

e. determining the slant range from said own station to said vehicle transponder, without transmission from said own station.

4,027,308
METHOD AND APPARATUS FOR FORMING DROPLETS FROM A MAGNETIC LIQUID STREAM

George J. Fan, Ossining, and Richard A. Toupin, Briarcliff Manor, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 28, 1973, Ser. No. 429,414
Int. Cl.² G01D 15/18
U.S. Cl. 346—1 20 Claims



1. A method of forming droplets at substantially uniform spacing of substantially uniform size from a pressurized magnetic liquid stream including:

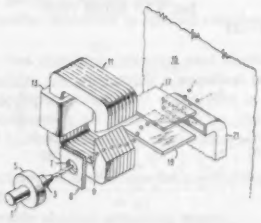
periodically applying a magnetic field having a non-uniform gradient to at least one segment of the stream at a predetermined position in the path of the stream prior to the position in the path of the stream at which the stream would randomly break-up after exiting from an opening or the like during its flow;

and selecting the maximum strength of the magnetic field to produce a perturbation in the stream having a wave length within the range at which the perturbation will grow.

4,027,309
INK JET PRINTER APPARATUS AND METHOD OF PRINTING

Donald Franklin Manning, Endicott, and Bruce Allen Wolfe, Johnson City, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 28, 1976, Ser. No. 680,814
Int. Cl.² G01D 15/18
U.S. Cl. 346—1 8 Claims



1. a method of controlling the flight of liquid drops comprising the steps of

generating a stream of drops of electrically conductive magnetizable liquid along a path toward an impacting surface;

inducing electrical charges on selected ones of said drops;

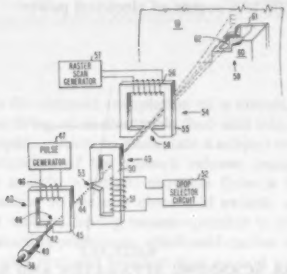
creating a variable magnetic force field of nonuniform flux density across said path to urge deflection of a series of said drops from said path to impact said surface along a line; and

establishing an electrostatic force field across said path for deflection of said charged drops from said path along a discard trajectory.

4,027,310
INK JET LINE PRINTER

Don L. Baker, and Dean William Skinner, both of Binghamton, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 16, 1976, Ser. No. 649,958
Int. Cl.² G01D 15/16
U.S. Cl. 346—75 5 Claims



1. In an ink jet printer apparatus, the combination with a stationary print medium for receiving ink drops in the form of a line of data patterns comprising

an ink jet print head movable in a continuous motion along a print line relative to said print medium,

said motion having acceleration, uniform velocity and deceleration phases,

said print head including

means for projecting an uninterrupted stream of ink drops in the direction of said print medium,

deflection means for selectively deflecting ink drops transverse to and parallel with said direction of motion, and

a drop collector for preventing unused ink drops from depositing on said print medium,

said drop collector having a first collector section extending transverse to and a second section extending parallel with the direction of motion of said print head, and

control means for operating said deflection means to deflect unused drops toward said first collector section for interception thereby during said uniform velocity phase of motion and toward said second collector section for interception thereby during the acceleration/deceleration phases of said motion.

4,027,311
THERMAL WRITING POWER

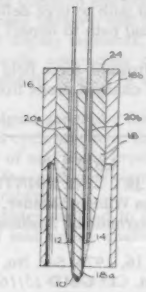
Biagio F. Ambrosio, Woodland Hills, Calif., assignor to Telautograph Corporation, Los Angeles, Calif.

Filed Oct. 31, 1975, Ser. No. 627,523
Int. Cl.² G01D 15/10, 15/16
U.S. Cl. 346—76 R 5 Claims

1. A thermal writing nib comprising

a resistive metal strip having a portion thereof coined to form a writing point,

means for backing said writing point for writing on thermal paper, and



means for connecting the ends of said resistive metal strip directly to a source of electrical power.

4,027,312

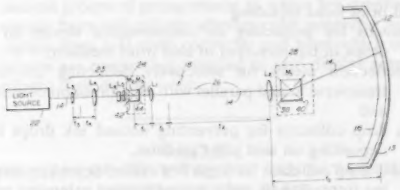
OPTICAL SCANNING APPARATUS AND METHOD FOR MANUFACTURING CATHODE RAY TUBES

John Schlafer, Wayland, Mass.; G. Norman Williams, and Robert F. Wilson, both of Seneca Falls, N.Y., assignors to GTE Laboratories Incorporated, Waltham, Mass. and GTE Sylvania Incorporated, Del.

Filed June 23, 1976, Ser. No. 699,110

Int. Cl.² G03B *41/00*

U.S. Cl. 354—1 **26 Claims**



1. An optical scanning apparatus for manufacturing cathode ray tubes having a layer of photosensitive material disposed on the faceplate inner surface and exposed by scanning a light beam over an adjacent apertured mask wherein the optical scanning apparatus includes a light source providing a light beam of a wavelength which exposes the photosensitive material, means disposed in the path of the light beam for deflecting the light beam at an angle related to an angle of incidence of an electron beam in a cathode ray tube, means for imaging the deflected light beam at the faceplate of the cathode ray tube, and means for scanning the deflected light beam over the apertured mask in a predetermined fashion to expose the photosensitive material adjacent the apertures of the mask, the improvement comprising means for controlling the effective area occupied by the light beam at the scanning means to effect control of the size and shape of the exposed area of photosensitive material in relation to an associated aperture in the mask.

4,027,313

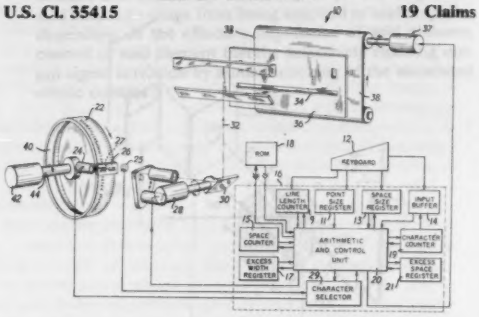
PHOTOCOMPOSING MACHINE AND FONT STRIP THEREFOR FOR KERNED CHARACTERS

Herbert Klepper, Brooklyn; Walter Hansen, Cold Spring Harbor; Joel S. Harris, Valley Stream, and Farrokh Golesorkhi, Commack, all of N.Y., assignors to Eltra Corporation, New York, N.Y.

Filed June 18, 1975, Ser. No. 587,856

Int. Cl.² B41L *13/08*

U.S. Cl. 35415 **19 Claims**



1. A character carrier for use in a photocomposing machine, said character carrier comprising an elongated strip of material having disposed thereon two longitudinal successions of elements aligned in laterally displaced relationship, the elements of one longitudinal succession being typographical characters and the elements of the other longitudinal succession being timing marks, there being a timing mark associated with each of the typographical characters;

said two longitudinal successions of elements having an optical transmissivity opposite to that of the remaining portion of said strip of material;

said typographical characters and associated timing marks being positioned laterally with respect to each other along said character carrier such that characters having a width which is equal to or less than a prescribed width have their right side bearings located at a fixed relative position with respect to their associated timing marks and characters having a width which is greater than said prescribed width have their right side bearings displaced to the right with respect to said fixed relative position by an amount substantially equal to the difference between the width thereof and said prescribed width.

4,027,314

SHUTTER AND LOW-LIGHT INDICATOR ACTUATING DEVICE FOR A CAMERA

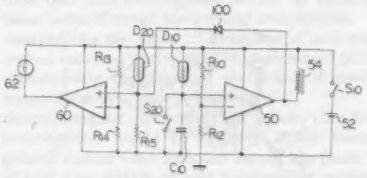
Susumu Iguchi, and Masamichi Furukawa, both of Tokyo, Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan

Filed Oct. 16, 1975, Ser. No. 623,164

Claims priority, application Japan, Oct. 21, 1975, 50-120355

Int. Cl.² G03B *7/08*

U.S. Cl. 354—31 **6 Claims**



1. A shutter and low-light indicator actuating device, comprising:

shutter actuator means;

shutter opening light sensing means operative to apply an electric shutter opening signal to the shutter actuator means for a length of time depending on a sensed light level, the shutter actuator means being operative to normally produce at an output thereof an electric shutter closing voltage and to produce an electric shutter opening voltage in response to the shutter opening signal;

low-light indicator actuator means;

low-light sensing means connected to an input of the indicator actuator means operative to produce a low-light voltage when light sensed thereby is below a low-light level, the indicator actuator means being operative to normally produce an indicator de-actuating voltage and to produce an indicator actuating voltage in response to the low-light voltage; and

a diode connected between the output of the shutter actuator means and the input of the indicator actuator means in such a manner that the diode is reverse biased by the shutter opening voltage and forward biased by the shutter closing voltage so as to conduct the shutter closing voltage to the input of the indicator actuator means, the indicator actuator means being operative to produce the indicator de-actuating voltage in response to the shutter closing voltage.

4,027,315

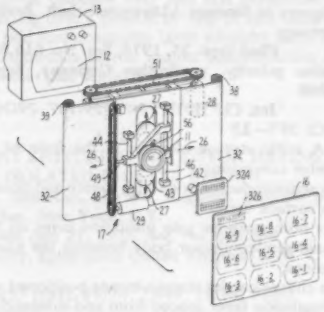
MULTIPLE IMAGE CAMERA

Howard Hunter Barney, Los Altos Hills, Calif., assignor to Dunn Instruments, Inc., San Francisco, Calif.

Filed Oct. 3, 1975, Ser. No. 619,450

Int. Cl.² G03B *29/00*

U.S. Cl. 354—76 **30 Claims**



1. Apparatus for receiving video output from a patient scanning device and photographing a plurality of video displays onto a sheet of film, comprising:

a video monitor adapted for connection to the scanning device and having a display tube;

a sheet film holder mounted in spaced relation to said display tube;

a wide angle lens mounted between said display tube and said film holder for projecting a minified image of the face of said display tube onto sheet film in said holder with the positioning of such image on the film being determined by the positioning of said lens with respect to said film;

a shutter associated with said lens for controlling passage of light therethrough;

manually operable shutter actuating means;

automtic means responsive to each operation of said shutter actuating means for repositioning said lens in the next one of a predetermined sequence of predetermined lens locations until each one of a corresponding plurality of image aeas on a sheet of film in said film holder is exposed; and

housing means formed for maintaining light-tight integrity between said lens and said film holder.

4,027,316

APPARATUS FOR DELAYED FIRING OF ELECTRONIC FLASH UNITS OR THE LIKE

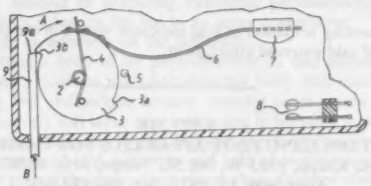
Rainer Vesper, Unterhaching, Germany, assignor to AGFA-Gevaert A.G., Leverkusen, Germany

Filed Apr. 18, 1975, Ser. No. 569,172

Claims priority, application Germany, Apr. 26, 1974, 2420184

Int. Cl.² G03B *15/02*

U.S. Cl. 354—141 **13 Claims**



8. Apparatus for delayed completion of a circuit, particularly for delayed firing of an electronic flash unit which is used with a photographic camera to illuminate a subject or scene in response to actuation of the camera release, comprising a normally open switch; a weight movable from a first to a second end position to thereby close said switch; an elastic carrier for said weight; driving means operable to move said carrier from a starting position in which said carrier maintains said weight in said first end position to a second position in which said carrier maintains said weight in said second end position; and means for operating said driving means; the elasticity of said carrier and the mass of said weight being such that said weight temporarily remains in or close to said first end position due to inertia following the movement of a portion of said carrier from said starting position toward said second position, said operating means comprising an impeller which is movable from a retracted to an extended position to thereby operate said driving means and which forms part of a photographic camera having means for supporting holders for flash lamps which are fired in response to movement of said impeller to said extended position.

4,027,317

CAMERA

Raimund Hauser, Vienna, and Harald Wessner, Neunkirchen, both of Austria, assignors to Karl Vockenhuber and Raimund Hauser, both of Vienna, Austria

Filed Oct. 2, 1973, Ser. No. 402,745

Claims priority, application Austria, Oct. 3, 1972, 8460/72; June 29, 1973, 5726/73

Int. Cl.² G03B *17/18, 17/20*

U.S. Cl. 354—289 **11 Claims**

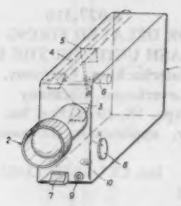
1. In a camera including objective means of changeable focal length, trigger means for briefly exposing a photosensitive element to light from said objective means, and a housing provided with seating means for an optional external attachment whose use reduces the risk of blurring during picture taking with a given exposure-time and focal-length setting, in combination:

sensing means operatively coupled with said objective means for distinguishing among different focal lengths thereof;

indicator means controlled by said sensing means for signaling a focal-length setting conductive to excessive blurring in the absence of said external attachment;

feeler means juxtaposed with said seating means for displacement by said external attachment; and

overriding means controlled by said feeler means for preventing actuation of said indicator means in the presence of said external attachment.



4,027,318

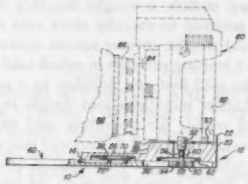
STABILIZING FOOT APPARATUS FOR CAMERA

Paul A. Knapp, 1303 W. 9th St., Tempe, Ariz. 85282

Filed Sept. 15, 1975, Ser. No. 613,450

Int. Cl.² G03B *17/56*

U.S. Cl. 354—293 **5 Claims**



1. Camera stabilizing foot apparatus, comprising in combination:

base means, including an upper platform and a lower platform extending outwardly from the upper platform;

a groove extending into the base means;

an extension movable in the groove adjacent the lower platform;

a recess disposed in the base means adjacent the groove;

a slot in the extension adjacent the recess in the housing means;

a spring disposed in the recess and biased against the extension to help hold the extension in place in the groove;

a tab on the spring extending into the slot to limit the movement of the extension relative to the base means; and

means for fastening a camera to the upper platform.

4,027,319

SCHOTTKY BARRIER PHOTOTRANSISTOR

Sebastian R. Borrello, Richardson, and Jimmy D. Sawyer, Garland, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 833,241, May 22, 1969, which is a continuation of Ser. No. 626,651, Jan. 25, 1967, abandoned, said Ser. No. 626,651, is a continuation of Ser. No. 848,126, April 25, 1969, abandoned. This application May 29, 1973, Ser. No. 364,995

Int. Cl.² H01L *29/48*

U.S. Cl. 357—15 **3 Claims**

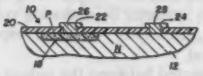
1. A photosensitive semiconductor device comprising:

a substrate of n-type semiconductor material, said semiconductor material selected from the group consisting of indium arsenide (InAs), indium antimonide (InSb) and gallium antimonide (GaSb),

said substrate being provided with a p-type region defined by diffused cadmium (Cd) in a selected portion thereof and opening onto one surface of said substrate, said p-type region having a surface modified zone,

said p-type region cooperating with said n-type substrate to define a photosensitive diode junction therebetween,

an insulating layer disposed on said one surface of said substrate and having openings therein in respective registration with said surface modified zone of said p-type region and with a portion of said substrate surface spaced from said surface modified zone of said p-type region, said insulating layer being transparent to light energy,



a nonalloyed metal contact member extending through one opening in said insulating layer and in rectifying contact with said surface modified zone of said p-type region to form a Schottky barrier diode junction therewith, and

a nonalloyed metal contact member extending through the other opening in said insulating layer and in ohmic contact with said one surface of said n-type substrate.

4,027,320

STATIC STORAGE ELEMENT AND PROCESS FOR THE PRODUCTION THEREOF

Erwin Jacobs, and Gerhard Dorda, both of Munich, Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Sept. 25, 1975, Ser. No. 616,585

Claims priority, application Germany, Sept. 26, 1974, 2446088

Int. Cl.² H01L *29/78, 29/167, 29/207*

U.S. Cl. 357—23 **2 Claims**

1. A static storage element in the form of a field effect transistor comprising:

a. a semiconductor body with source and drain zones facing a surface thereof;

b. a homogeneous gate insulation layer on the surface of said semiconductor body between the source and drain zones;

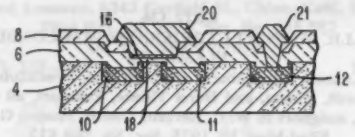
c. a charge-carrier storage means positioned within the gate insulation layer spaced from and substantially parallel to the semiconductor body surface for intercepting charge carriers produced by exposure of the transistor to relatively high frequency electromagnetic radiation for storage of said charge carriers, and releasing charge carriers when the transistor is exposed to relatively low frequency electromagnetic radiation for removal of said charge carriers from the storage means; and

d. said charge-carrier storage means comprising a region of implanted non-doping ions for producing lattice storage defects or traps for said charge carriers, said ions comprising an element selected from a group consisting of Krypton and Xenon, said region having a plane of maximum trap or defect concentration substantially parallel to and spaced from the semiconductor body surface of at least 10^{11} traps or defects per cm^2 and a boundary plane of relatively low defect or trap concentration spaced from and parallel to the boundary surface, the portion of said gate insulation layer between the boundary plane and the semiconductor body surface having planes of trap or defect concentrations substantially the same as said boundary plane of relatively low trap or defect concentration.

4,027,321
RELIABLE MOSFET DEVICE AND METHOD FOR MAKING SAME

Robert Henry Collins, Wappingers Falls; Richard F. Levine, Poughkeepsie; William D. North, Poughkeepsie; Gerald D. O'Rourke, Poughkeepsie, and Gerald R. Parker, Wappingers Falls, all of N.Y., assignors to IBM Corporation, Armonk, N.Y.

Continuation of Ser. No. 357,046, May 3, 1973, abandoned. This application Apr. 29, 1976, Ser. No. 681,662
Int. Cl.² H01L 29/78
U.S. Cl. 357—23 5 Claims

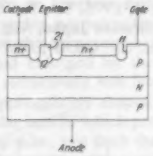


1. A field effect transistor comprising:
a body of monocrystalline semiconductor material;
a channel within said body and adjacent a surface thereof;
a source region and a drain region within said body adjacent said surface, said regions being connected to and defining the ends of said channel;
a first composite coating overlying said channel including a thin layer of insulator material and a thin layer of material for trapping ionic contaminants;
a second composite coating disposed over said source and drain regions including a thick layer of insulator material and a thick layer of material for trapping ionic contaminants disposed atop said thick layer of insulator material;
a gate electrode disposed over said first composite layer, and extending over a portion of both of said thick layers adjacent said first composite layer whereby there is provided a continuous barrier against contamination in the regions within said semiconductor body.

4,027,322
ZERO POINT SWITCHING THYRISTOR HAVING AN ISOLATED EMITTER REGION

Rudolf A. H. Heinecke, Harlow, England, assignor to ITT Industries, Inc., New York, N.Y.

Filed Oct. 21, 1975, Ser. No. 624,506
Claims priority, application United Kingdom, Feb. 4, 1975, 04712/75
Int. Cl.² H01L 29/74, 23/48, 29/44, 29/52
U.S. Cl. 357—38 5 Claims



1. A controlled rectifier device, including a four-layer silicon PNP structure comprising:
a first outer layer of P-type conductivity forming an anode;
a second outer layer of N-type conductivity forming a cathode;
an inner layer of P-type conductivity, a portion of which extends through said second layer for forming a gate beside said cathode;
means for electrically isolating said gate from said cathode;
at least one emitter region formed by regions of said inner P-type layer protruding through said second layer; and
an annular channel surrounding said emitter region for electrically isolating said emitter region from said cathode.

4,027,323
PHOTODETECTOR ARRAY DELINEATION METHOD

Robert V. Lorenze, Jr., Westford, and Miriam F. Young, Dorchester, both of Mass., assignors to Honeywell Inc., Minneapolis, Minn.

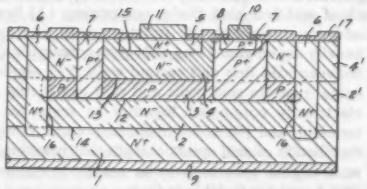
Filed Sept. 7, 1976, Ser. No. 720,918
Int. Cl.² H01L 27/14, 31/00; C23F 1/00; C23G 1/00
U.S. Cl. 357—30 12 Claims

1. A method of preparing individual photodetector elements on a substrate for use in an array comprising:
placing an adhesive on the substrate;
mounting a body of the photodetector on said adhesive;
placing a mask on said photodetector body, said mask having first and second erosion resistant outer layers and a relatively soft layer attached to and in between said outer layers, said outer layers defining apertures for access to portions of said substrate and said photodetector body not part of the desired individual photodetector elements, said first outer layer being closer to said photodetector body and defining a smaller aperture than the aperture defined by said second outer layer, so that a line from the aperture of said second outer layer to the aperture of first outer layer intersects said substrate at an angle of from 30° to 60° with respect to the plane of the substate, thereby defining a bevel angle;
air abrading said mask in a direction essentially parallel to said bevel angle to remove undesirable photodetector body and adhesive from said substrate;
whereby said photodetector elements and adhesive remaining have at least one bevelled edge; and
removing said mask from the remaining individual photodetector elements thereby formed.

4,027,324
BIDIRECTIONAL TRANSISTOR

Hajime Yagi, Tokyo, and Tadaharu Tsuyuki, Isehara, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 561,914, March 25, 1975, which is a continuation-in-part of Ser. No. 427,648, Dec. 26, 1973, abandoned. This application Jan. 21, 1976, Ser. No. 651,161
Claims priority, application Japan, Dec. 29, 1972, 47-550; Mar. 28, 1974, 49-35307; Oct. 31, 1974, 49-125869
Int. Cl.² H01L 29/72, 29/747, 27/02
U.S. Cl. 357—34 7 Claims



1. A semiconductor device comprising:
a. a semiconductor substrate having a major surface;
b. a first semiconductor region of one conductivity type;
c. a second semiconductor region of the opposite conductivity type facing said surface, surrounding said first region forming a first PN junction therewith;
d. a third semiconductor region of said one conductivity

type surrounding said second region forming a second PN junction therewith;

e. said first region having a first lightly doped portion adjacent to said first PN junction and a first heavily doped portion facing said surface and forming a third junction between said first lightly and first heavily doped portions;

f. said third junction being located from said first PN junction by a distance whose greatest distance in a perpendicular direction at any point in said first PN junction is less than the diffusion length L_1 of minority carriers in said lighly doped portion and having an electric field at said third junction which is larger than 10^3V/cm.

g. said third region having a second lightly doped portion adjacent to said second PN junction and a second heavily doped portion facing said surface, surrounding said lightly doped portion and forming a fourth junction between said second lightly and second heavily doped portions;

h. said fourth junction being located from said second PN junction by a distance whose greatest distance in a perpendicular direction at any point in said second PN junction is less than the diffusion length L_2 of minority carriers in said lighly doped portion and having an electric field at said fourth junction which is larger than 10^3V/cm, and

i. biasing means for transporting majority carriers in said first region to said third region in a first period and transporting majority carriers in said third region to said first region in a second period.

4,027,325

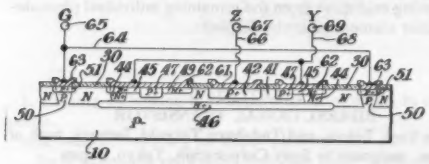
INTEGRATED FULL WAVE DIODE BRIDGE RECTIFIER

Robert C. Genesi, Sterling, Mass., assignor to Sprague Electric Company, North Adams, Mass.

Filed Jan. 30, 1975, Ser. No. 545,441

Int. Cl.² H01L *27/04*

U.S. Cl. 357—48 **3 Claims**



1. In an integrated circuit formed in a silicon body of P-type having grown on a surface thereof an epitaxial layer of N-type and an oxide layer having been grown over said layer, a full wave junction-diode bridge rectifier, that includes two diodes of a first kind having their anodes connected to a circuit ground terminal and two diodes of a second kind having cathodes connected to a +d.c. output terminal, each of said diodes being formed in a separate part of said epitaxial layer,

each of said first kind diodes comprising: (1) first and second annular concentric isolation walls of P-type; (2) a heavily doped guard ring of N-type concentrically located between said first and second walls; (3) ohmic contacts being made to said walls and said guard ring and being electrically connected together to serve as an anode terminal; and (4) another ohmic contact being made to the portion of said epitaxial layer that is within the innermost of said walls to serve as a cathode terminal;

each of said second kind diodes comprising: (a) a third annular isolation wall of P-type; (b) a second heavily doped guard ring of N-type lying within and essentially concentric with said third wall; (c) a heavily doped buried layer of N-type lying in contact with a buried annular portion of said second guard ring; (d) a heavily doped anode region of P-type lying in the portion of said epitaxial layer that is enclosed within said second guard ring; (e) an ohmic contact being made to said guard ring to serve as a cathode terminal; (f) a shallow annular region of P-type that is within and essentially concentric with said second guard ring, said shallow annular region of P-type being open and having an open space therein, and having an ohmic connection to said guard ring; (g) a shallow heavily doped N-type region being spaced from but closely adjacent to said anode region, said shallow N+ region having an ohmic connection to said cathode terminal; (h) an ohmic contact being made to said anode region and extending over said oxide layer above said open space; and (i) an ohmic contact being made to said third wall being connected to said ground terminal.

4,027,326

METALLIC SUPPORT CARRIER FOR SEMICONDUCTOR ELEMENTS

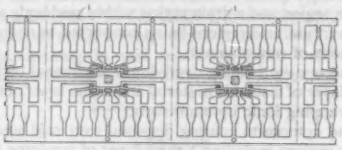
Franz Kummer, Rodenbach; Gerhard Mai, Bruchkobel; Rolf Ruthardt, Hanau, and Horst Thiede, Rossdorf, all of Germany, assignors to W. C. Heraeus GmbH, Hanau, Germany

Filed Mar. 20, 1975, Ser. No. 560,532

Claims priority, application Germany, Apr. 20, 1974, 2419157

Int. Cl.² H01L *23/48, 29/44, 29/52; 29/54*

U.S. Cl. 357—67 **9 Claims**



1. Metallic carrier for semiconductor structures, and to form attachment terminals for lead wires for connection to the semiconductor structures, having at least one contact finger of a base or substrate metal, and a metallic bonding layer applied thereto;

wherein the improvement comprises the combination of:

the bonding layer has spongy, microporous structure;

the bonding layer is located on the carrier at a selected, discrete position on at least one contact finger; and

the bonding layer and the substrate metal of the metallic contact strip or finger are joined together at said discrete positions by a diffusion zone.

4,027,327

VIEW FINDER FOR REFLEX CAMERA

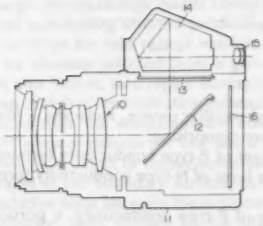
Yuho Harada, Omiya, Japan, assignor to Fuji Photo Optical Co., Ltd., Omiya, Japan

Filed Aug. 4, 1975, Ser. No. 601,431

Claims priority, application Japan, Aug. 9, 1974, 49-91368

Int. Cl.² G03B *13/08*

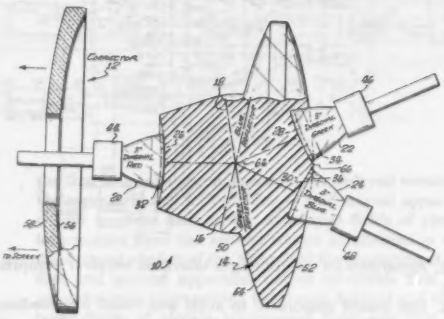
U.S. Cl. 354—201 **5 Claims**



1. A view finder for a reflex camera comprising a mirror

located behind a taking lens of the camera to receive light passing through the taking lens and reflect the light, a holographic lens provided in said camera to receive the light reflected from said mirror and having a function to converge the light passing therethrough, said holographic lens being located substantially on a plane equivalent to the focal plane of the taking lens, and an eyepiece located optically behind said holographic lens to which the light from the holographic lens converges.

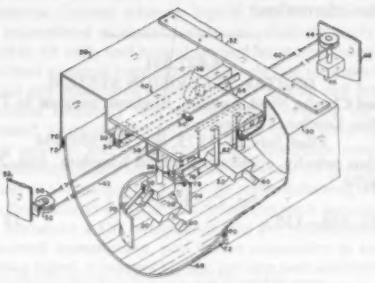
4,027,328
CATADIOPTRICALLY COUPLED COLOR TELEVISION PROJECTION SYSTEM
Gerhard Lessman, 6243 Garfield St., Chino, Calif. 91710
Filed Nov. 28, 1975, Ser. No. 635,982
Int. Cl.² H04N 9/16, 5/74
U.S. Cl. 358—64 **18 Claims**



1. An optical system similar to the classical Schmidt type, having a plurality of beamsplitter surfaces embedded within an optical element which forms the converging portion of said optical system and a plurality of cathode ray tubes immersed within said optical system such that optical paths from the emitting faces of said cathode ray tubes remain within said optical system until the several images of said cathode ray tube faces are superimposed in registration for projection by said optical system.

7. An optical projection system similar to the classical Schmidt type, comprised of an optical converging portion having immersed therein two beamsplitter planes and three single color cathode ray tubes, such that one of said cathode ray tubes, emitting television images in one of a set of three complementary primary colors is immersed on the axis of said optical converging portion in a manner so as to directly illuminate a primary mirror surface located at the opposite end of said converging portion, said images passing through the beamsplitters which are transparent to said color and being angularly limited by an aperture stop created by the dimensions of said converging portion orthogonal to the axis in the region occupied by the immersed beamsplitters, said images being reflected and enlarged by the shape of the primary mirror surface to refractively exit from said converging portion through an appropriately shaped annular surface region into air as an annular bundle which projects an enlarged image of said cathode ray tube; and such that a second of the three cathode ray tubes, emitting television images in a second of the set of three complementary primary colors is immersed into the primary mirror surface of said converging element such that said second color images are transmitted through the material of said converging element unimpeded by one of the two beamsplitter planes, namely the one coated so as to be reflective to the third of the set of three complementary primary colors, until they impinge upon the other, second-color-reflective beamsplitter plane, whereupon the appropriately divergent images are reflected toward said primary mirror surface in superposition with said first color images for projection through the balance of said optical system, said second-color-reflective beamsplitter surface serving as the aperture stop for these images; and such that the third of said cathode ray tubes, emitting television images in the third of the set of three complementary primary colors, is immersed into said primary mirror surface in a manner similar to that of said second color cathode ray tube, such that third color images are projected through said optical system like those from said second color cathode ray tube, except that the second-color-reflective beamsplitter surface appears transparent to said third color images, while the third-color-reflective beamsplitter surface reflects said third color images toward said primary mirror surface, said beamsplitter planes being disposed so as to superimpose said second color and third color images upon the system axis in registration with said first color images.

4,027,329
SURVEILLANCE SYSTEM
John M. Coutta, 450 Superior Ave., Decatur, Ga. 30030
Continuation of Ser. No. 530,133, Dec. 6, 1974. This application Jan. 26, 1976, Ser. No. 652,631
The portion of the term of this patent subsequent to Jan. 27, 1992, has been disclaimed.
Int. Cl.² H04N 7/18
U.S. Cl. 358—108 **15 Claims**

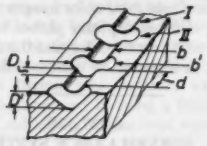


1. A surveillance system comprising:
an elongated carriage track positoned along a line;
a carriage adapted to be supported by and be movably operated along said track;
drive means for positioning said carriage along said track;
a television camera supported by said carriage and positoned to view regions on the side of said track;
light attenuating means including an at least partially opaque cover extending from end to end of said track for blocking light transmission in through one region of said cover and out through another region of said cover whereby the outlines of said camera and said carriage are hidden;
display means for displaying the output of said camera; and
control means for selectively operating said drive means for selectively positioning said carriage along said track, whereby said camera may be positioned and selectively view a particular side region.

4,027,330
DISC RECORDING
Stefan Maslowski, Aufheim; Peter Huber, Thalfingen, and Horst Redlich, Berlin, all of Germany, assignors to TED-Bildplatten Aktiengesellschaft, AEG-Telefunken, TELDEC, Zug, Switzerland
Filed Mar. 27, 1974, Ser. No. 455,395
Claims priority, application Germany, Mar. 27, 1973, 2315735; Mar. 27, 1973, 7311922[U]
Int. Cl.² H04N 5/76; G11B 3/72, 11/12
U.S. Cl. 358—128 **7 Claims**

1. A record carrier in which a spatial representation of information is recorded along a continuous guide path and is

to be played back according to the pressure scanning technique, said carrier having a groove-shaped recording track extending along the path and composed of a continuous strip having a constant width constituting a track guide for the guidance of a pressure transducer playback device, and a series of rounded protrusions alternating with sections of finite length of the continuous strip along the path and constituting consecutive spots modulated in accordance with the information, the protrusions extending laterally from said strip to present recesses in the carrier and being arranged substantially symmetrically to the center line of said strip, the peripheries of the recesses having the form of ellipses whose major axes are perpendicular to the length of the recording track, and the recesses being formed by a laser beam which has an elliptical cross section and which is modulated in accordance with the information.



4,027,331

DIGITAL TELEVISION SYSTEM

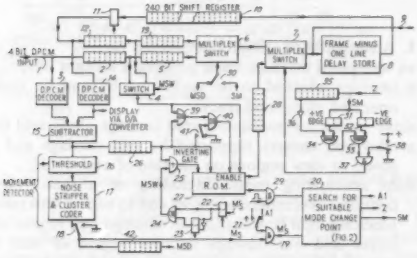
Richard Charles Nicol, London, England, assignor to The Post Office, London, England

Filed July 24, 1975, Ser. No. 598,634

Claims priority, application United Kingdom, Aug. 2, 1974, 34206/74

Int. Cl.² H04N 7/12

U.S. Cl. 358—135 **15 Claims**



1. A digital television system having a transmitter for transmitting digital signals depending on the light intensity of consecutive picture elements of a scanned image, and a receiver for reproducing the image in response to the digital signals, in which both the transmitter and the receiver include storage means for storing digit groups respectively relating to the intensities in the picture elements constituting one frame of the image, and the transmitter further includes means for detecting changes in intensity of picture elements from one frame to the next and for producing in each frame period digital signals for updating at least those of the digit groups stored in the storage means which correspond to picture elements whose intensity has changed, means responsive to the digital signals for updating digit groups stored in the storage means in the transmitter and for transmitting the digital signals to the receiver for updating digit groups stored in the storage means therein, wherein each digital signal represents the difference in/intensity between the particular picture element and a preceding picture element having a predetermined spacing from the particular element of the image in the same frame, and means is provided for controlling the means for producing digital signals to smooth the transitions between updated and unaltered digit groups in the storage means representing adjacent picture elements in the same line of the same frame.

4,027,332

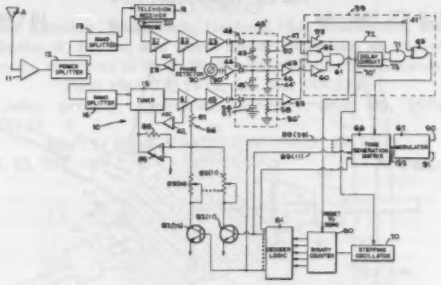
APPARATUS FOR MONITORING TELEVISION RECEIVERS

Joseph C. Wu, Saratoga; Clyde R. Walsworth, Sunnyvale, and Calvin W. Eckels, Jr., San Jose, all of Calif., assignors to Time and Frequency Technology Inc., Santa Clara, Calif.

Filed Nov. 21, 1975, Ser. No. 634,248

Int. Cl.² H04N 7/02

U.S. Cl. 358—139 **20 Claims**



1. Apparatus for monitoring a television receiver comprising:

a. first means responsive to aural and visual intermediate frequency signals from a television receiver being tuned to a broadcasting channel for producing a first intercarrier signal;

b. second means tunable to a broadcasting channel and responsive to aural and visual intermediate frequency signals from a television broadcasting signal source for producing a second intercarrier signal in response to being tuned to a broadcasting channel;

c. third means connected to said second means for causing said second means to be tuned sequentially to a plurality of television broadcast channels; and

d. fourth means includng a phase detector comparator circuit responsive to said first intercarrier signal and said second intercarrier signal, said fourth means applying a first output voltage to said third means in response to said first and second intercarrier signal being incoherent for causing said second means to be tuned to another broadcasting channel, said fourth means producing a second output voltage in response to said first and second intercarrier signals being coherent to represent said first and second means being tuned to the same broadcasting channel.

4,027,333

MULTIPLEX COLOR TELEVISION TRANSMISSION SYSTEM

Arthur Kaiser, Trumbull; Henry W. Mahler, Newtown, and Renville H. McMann, Jr., New Canaan, all of Conn., assignors to CBS Inc., New York, N.Y.

Filed Dec. 9, 1975, Ser. No. 639,012

Int. Cl.² H04N 7/08

U.S. Cl. 358—146 **22 Claims**

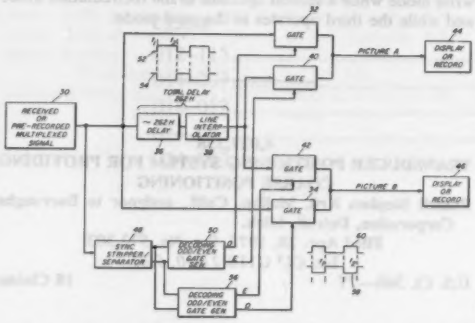
12. Apparatus for reproducing picture information contained in a multiplexed signal consisting of odd-numbered fields from a first source of color picture information in alternation with even-numbered fields from a second source of color television picture information synchronized with said first source, said apparatus comprising:

first and second apparatus output terminals,

means for separating the fields of picture information from the first source from the fields of picture information from the second source,

means for delaying each of said separated fields for a period differing from one television field by one-half of a television line, and

means for coupling to said first apparatus output terminal each of the undelayed fields of picture information from



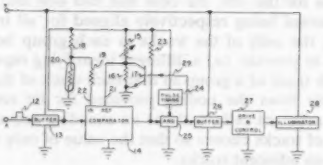
the first source in alternation with the delayed version of the same field and for coupling to said second apparatus output terminal each of the undelayed fields of picture information from the second source in alternation with the delayed version of the same field for producing at said first and second apparatus output terminals first and second signals representing interlaced delayed and undelayed fields of picture information from said first and second sources, respectively.

4,027,334

STANDBY ILLUMINATOR FOR REMOTE CONTROLLED VIEWER

Wayne T. Grant, Springfield, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 10, 1975, Ser. No. 621,321
Int. Cl.² H04N *5/33, 5/38, 7/18*
U.S. Cl. 358—210 **3 Claims**



1. In a remote viewing system wherein a television camera translates an image of a distant scene into a video electronic signal in response to a camera pulse having a width equal to at least one camera frame:

an illuminator having a spectrum which overlaps at least a portion of the light spectrum to which said camera responds; and

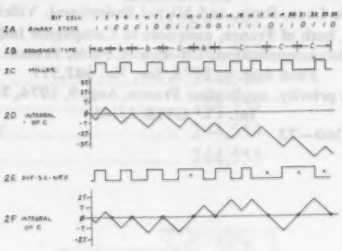
a stand-by circuit means intercoupling said camera and illuminator, which requires less power in the absence of said camera pulse than in the presence of said camera pulse, to energize said illuminator only when the ambient light level is too low for translation by said camera and only when said camera pulse is present.

4,027,335

DC FREE ENCODING FOR DATA TRANSMISSION SYSTEM

Jerry Wayne Miller, Menlo Park, Calif., assignor to Ampex Corporation, Redwood City, Calif.

Filed Mar. 19, 1976, Ser. No. 668,679
Int. Cl.² G11B *5/09*
U.S. Cl. 360—40 **14 Claims**



1. In a self-clocking transmission system for transmitting binary data sequentially in successive clocked bit cells of a transmission channel wherein logical first bit states are normally transmitted as signal transitions relatively early in the respective bit cells and logical second bit states are normally transmitted as signal transitions relatively late in respective bit cells and any transitions relatively early in a bit cell following a transition relatively late in the next preceding bit cell is suppressed, apparatus for modifying the transmitted signal to remove any net DC component, said apparatus comprising first indicating means responsive to bit states for producing at the onset of a sequence of second bit states following a first bit state a first indicating signal indicating any such sequence that might introduce a DC component into the transmitted signal with normal transmission, and means responsive to said first indicating signal, a current bit and but one next succeeding bit for modifying the transmission of signal transitions to eliminate any DC components.

4,027,336

MOTOR SPEED CONTROL DEVICE

Rodney Bryant Jordan, Rte. 2, Box 43, Florien, La. 71429

Filed Mar. 13, 1975, Ser. No. 558,056
Int. Cl.² G11B *15/46*
U.S. Cl. 360—73 **2 Claims**

1. For use in a tape player having an amplifier which produces current only during the playing of a recorded message on tape a motor, a first power source which under normal playing conditions provides a pre-determined amount of current to said amplifier and to said motor to reel a tape through said tape player and wherein said motor reels said tape at a faster speed upon receiving additional current, a device for selectively fast reeling said tape by supplying said motor with additional current, comprising:

a. rectifier means for receiving said amplifier current and converting said current to direct current;

b. a switching means;

c. a transistor switching means;

d. a second power source;

e. a silicon controlled rectifier, said switching means connected in series to said rectifier means and to said silicon controlled rectifier's gate, said switching means being momentarily activated when it is desired to increase said motor's speed, said silicon controlled rectifier having an anode connected to said rectifier means and a cathode connected to said transistor switching means, said current flows between said cathode and anode after current has passed through said base and until said amplifier stops producing current, said transistor switching means having a base connected to said cathode, a collector connected

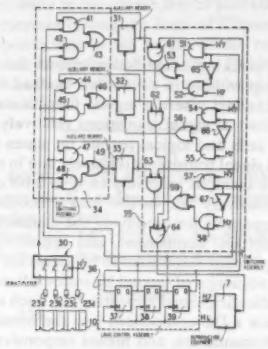
to said motor and an emitter connected to said second power source, said transmitter switch means allowing current from said second power source to pass to said motor only when current flows from said cathode to said anode.

4,027,337

INSTALLATION FOR THE REMOTE TRANSMISSION OF FACSIMILES

Martin de Loye, Paris, and Michel Beduchaud, Villebon-sur-Yvette, both of France, assignors to Compagnie Industrielle des Telecommunications Cit-Alcatel, Paris, France

Filed Aug. 6, 1975, Ser. No. 602,517
Claims priority, application France, Aug. 9, 1974, 74.27730
Int. Cl.[2] G11B *15/46*
U.S. Cl. 360—73 7 Claims



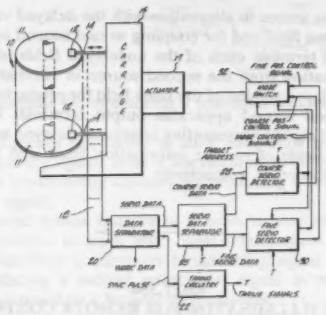
1. An apparatus for the transmission of facsimile comprising a transmitter assembly providing a signal of binary data to be transmitted over a distance, a receiver assembly providing an image from a signal of binary control data and a transmission line between the assemblies, the apparatus comprising, in the transmitter and receiver assemblies respectively, a first and second buffer-memory using a multi-track recording tape for matching the rates of the binary data signal to be transmitted and the binary data control signal to the rate of transmission of the line, and comprising furthermore, in said second buffer-memory, a compensation device for the fluctuations of drive speed of the tape, said compensation device comprising means for recording clock pulses provided by the receiver assembly on one track of the tape, called pilot track, at the rate of recording of data on the tape, three auxiliary memories for memorizing data corresponding to an image block or image line, switching assemblies connected to respective inputs of the auxiliary memories, and a control circuit for the switching assemblies for defining from the rate of producing an image block in the receiver assembly a cyclic operation of each of the auxiliary memories successively in a write mode at the rate of clock pulses read on the pilot track for memorizing of the data read on the tape, in a recirculation mode at the rate of clock pulses of production of successive points of the image for the putting in phase of the recorded data, and in a read mode at the rate of the clock pulses of production of successive points of the image for the control of the production of this image, one of the auxiliary memories operating in the write mode while a second operates in the recirculation mode and while the third operates in the read mode.

4,027,338

TRANSDUCER POSITIONING SYSTEM FOR PROVIDING COARSE POSITIONING

Russell Stephen Kril, Malibu, Calif., assignor to Burroughs Corporation, Detroit, Mich.

Filed Apr. 28, 1975, Ser. No. 572,303
Int. Cl.[2] G11B *21/10, 5/82*
U.S. Cl. 360—77 18 Claims



11. A recording and reproducing medium for use in a servo system for positioning a relatively moving transducer means tranversely with respect to a plurality of groups of tracks provided on said medium, each group containing at least three tracks, said medium containing servo data manifestations recorded in each track so as to constitute a plurality of adjacent cells each having a manifestation at either a first or a second location of the cell indicative of either a first or a second value for the cell, the cells and said first and second locations thereof being respectively aligned for all tracks of each group, the cells of the tracks in each group being encoded so as to provide: (a) a different identifying representation for each track of a group so that each track of the group is identifiable from the coding provided for its respective plurality of adjacent cells, and (b) an encoding sequence for each group of tracks chosen so that the value of only one cell is different on adjacent tracks.

DESIGN PATENTS

GRANTED MAY 31, 1977

ERRATA

For CLASS	See PATENT NO.
012–115	244,512
014–037	244,550
014–012	244,551
024–055	244,554
024–023	244,555

DESIGNS

MAY 31, 1977

244,491

SAFETY HELMET WITH EAR MUFFS FOR HEARING PROTECTION AND FASTENING DEVICE THEREFOR

Kalman Csiki, Landskrona, and Tord Rune Lundin, Billesholm, both of Sweden, assignors to Gullfiber AB, Billesholm, Sweden

Filed Oct. 31, 1975, Ser. No. 627,868

Claims priority, application Sweden, May 2, 1975, 75949

Term of patent 14 years

Int. Cl. D2—*03*

U.S. Cl. D2—232

244,492

PROTECTIVE FOOTWEAR

Tibor Schonbrun, and Victorien Tremblay, both of Montreal, Canada, assignors to Genesport Industries, Ltd., Montreal, Canada

Filed Mar. 3, 1975, Ser. No. 554,620

Term of patent 14 years

Int. Cl. D2—*04*

U.S. Cl. D2—271

244,493

CIGARETTE LIGHTER HOLDER

Willard C. Knight, 2777 Sherman Blvd., Fort Wayne, Ind. 46808

Filed July 11, 1975, Ser. No. 595,077

Term of patent 14 years

Int. Cl. D2—*07*

U.S. Cl. D2—400

244,494

STEP STOOL

Robert J. Dottinger, Hawthorne, N.J., assignor to Litton Business Systems, Inc.

Division of Ser. No. 10,688, Feb. 23, 1968, Pat. No. Des. 216,508. This application Jan. 12, 1970, Ser. No. 20,886

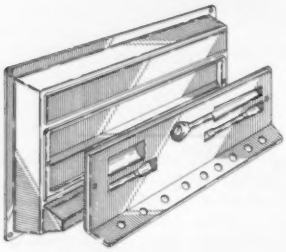
Term of patent 14 years

Int. Cl. D6—*01*

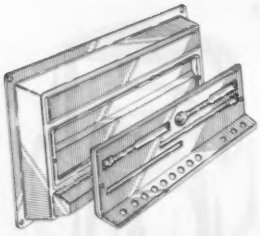
U.S. Cl. D6—32

244,495
CHAIR OR SIMILAR ARTICLE
Warren D. Petersen, St. Charles, Ill., assignor to Burd, Inc., Howell Division
Filed July 20, 1976, Ser. No. 707,107
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—78

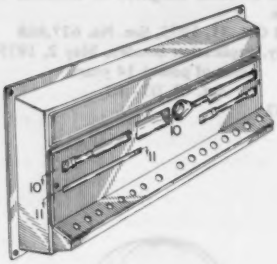
244,496
DISPLAY RACK FOR TOOL SET
Hugh T. Greenlee, Gates Mills, Ohio, assignor to The Wright Tool & Forge Co., Barberton, Ohio
Filed Apr. 12, 1976, Ser. No. 676,287
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—114



244,497
DISPLAY RACK FOR TOOL SETS
Hugh T. Greenlee, Gates Mills, Ohio, assignor to The Wright Tool & Forge Co., Barberton, Ohio
Filed Apr. 12, 1976, Ser. No. 676,289
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—114

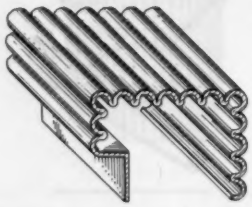


244,498
DISPLAY RACK FOR TOOL SETS
Hugh T. Greenlee, Gates Mills, Ohio, assignor to The Wright Tool & Forge Co., Barberton, Ohio
Filed Apr. 12, 1976, Ser. No. 675,705
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—114



244,499
DISPLAY RACK FOR CASSETTES
Anthony D. Parfitt, Slough, England, assignor to Sales Achievement Limited, England
Filed Oct. 20, 1975, Ser. No. 624,060
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—186

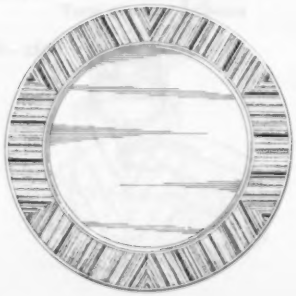
244,500
FRAME MOLDING
Greg Copeland, 114 Beach Terrace, Wayne, N.J. 07470
Filed July 18, 1975, Ser. No. 596,947
Term of patent 14 years
Int. Cl. D6—*07*
U.S. Cl. D6—246



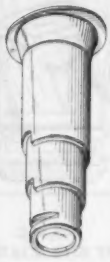
244,501
BEVERAGE GLASS OR THE LIKE
Susanne J. Jacobus, 2117 Fairview Road, Raleigh, N.C. 27608
Filed Sept. 7, 1976, Ser. No. 720,948
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—11

244,502
BEVERAGE GLASS OR SIMILAR ARTICLE
Theodore H. Harbaugh, and Melvin B. Lee, both of Toledo, Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio
Filed Dec. 29, 1975, Ser. No. 644,993
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—14

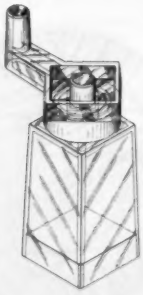
244,503
DINNER PLATE OR SIMILAR ARTICLE
George B. Jensen, Syracuse, N.Y., assignor to Syracuse China Corporation, Syracuse, N.Y.
Filed June 26, 1975, Ser. No. 590,692
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—36



244,504
MEASURING VESSEL
William James Merz, 220 W. Rittenhouse Square, Philadelphia, Pa. 19103
Filed Feb. 5, 1976, Ser. No. 655,505
Term of patent 14 years
Int. Cl. D7—*04, 07*
U.S. Cl. D7—51

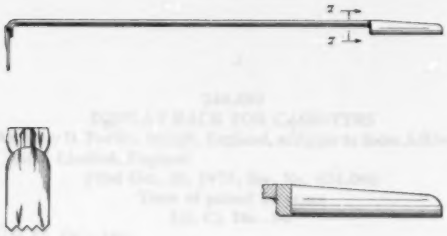


244,505
CONDIMENT MILL
William E. Bounds, 23790 Hawthorne Blvd., Torrance, Calif. 90505
Filed Sept. 22, 1975, Ser. No. 616,164
Term of patent 14 years
Int. Cl. D7—*06*
U.S. Cl. D7—53

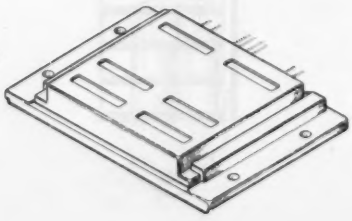


244,506
ROLLER FOR REMOVING WATER FROM TENNIS COURTS, GOLF GREENS AND THE LIKE
Conrad A. Yankee, 103 Seaview Ave., West Haven, Conn. 06516
Filed Sept. 15, 1975, Ser. No. 613,441
Term of patent 14 years
Int. Cl. D7—*05*
U.S. Cl. D7—179

244,507
COMBINED SCRAPER AND SCOOP FOR USE IN CLEANING A HOT WATER HEATER
Danny R. Jones, Rte. 1, Jefferson City, Mo. 65101
Filed May 14, 1976, Ser. No. 686,550
Term of patent 14 years
Int. Cl. D7—*05*
U.S. Cl. D7—183

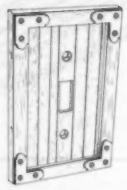


244,508
SLIDE MOUNT BRACKET FOR A RADIO AND THE LIKE
Roy M. Neece, 3248 Cheryl Lane, Haltom City, Tex. 76117
Filed Apr. 22, 1976, Ser. No. 679,156
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—354



244,509
CLEANING COMPOSITION CONTAINER
David A. Jones, Bellbrook, and Philip R. Goyert, Cincinnati, both of Ohio, assignors to The Drackett Company, Cincinnati, Ohio
Filed Feb. 9, 1976, Ser. No. 656,498
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—164

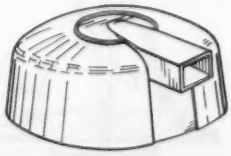
244,510
WALL PLATE
Joan Grieb, New York, N.Y., assignor to General Electric Company
Filed Sept. 16, 1975, Ser. No. 613,834
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—351



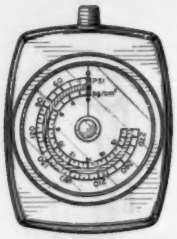
244,511
DESIGN FOR DRAPERY PACKAGING TRAY
Michael D. Frisbey, 6891 S. Uinata St., Englewood, Colo. 80110
Filed May 12, 1975, Ser. No. 576,803
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—242

244,512
BICYCLE SUPPORTING HANGER OR SIMILAR ARTICLE
David L. Edwards, 210 W. Crescent, Elmhurst, Ill. 60126
Filed Dec. 8, 1975, Ser. No. 638,621
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D12—115

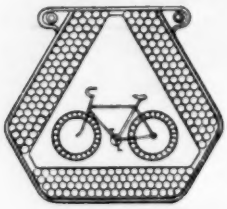
244,513
ACTUATOR CAP FOR A PRESSURIZED DISPENSER
Roger Anthony Butcher, Horndean, England, assignor to Aerosol Inventions and Development S.A. A.I.D.S.A.
Filed Nov. 28, 1975, Ser. No. 636,148
Claims priority, application United Kingdom, June 27, 1975, 971664/75
Term of patent 14 years
Int. Cl. D9—*07*
U.S. Cl. D9—258



244,514
COMPRESSION TESTER
Edwin L. Schwartz, Los Angeles, Calif., assignor to Rite Autotronics Corporation, Los Angeles, Calif.
Filed Aug. 25, 1975, Ser. No. 607,252
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—85



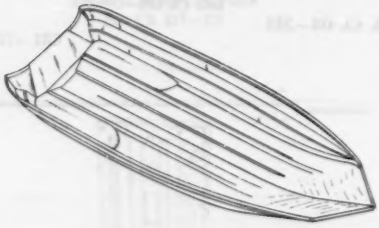
244,515
BICYCLE REFLECTOR
Anthony Tuleja, P.O. Box 1564, Sarasota, Fla. 33578
Filed Mar. 29, 1976, Ser. No. 671,709
Term of patent 14 years
Int. Cl. D26—*06*
U.S. Cl. D10—111



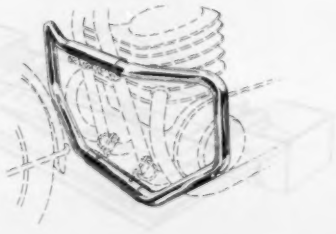
244,516
PENDANT
John Lewis, 1012 N. West End Blvd., Cape Girardeau, Mo. 63701
Filed Nov. 7, 1975, Ser. No. 629,709
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—81

244,517
CIGARETTE MOBILE
Ernest Newell Spencer, 8625 Lakeview Drive, Orchard Beach, Lexington, Mich. 48450
Filed Oct. 17, 1975, Ser. No. 623,466
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—141

244,518
BOAT HULL
Darris E. Allison, Rte. 4, Box 1, Louisville, Tenn. 37777
Filed Mar. 5, 1976, Ser. No. 664,408
Term of patent 14 years
Int. Cl. D12—*06*
U.S. Cl. D12—62



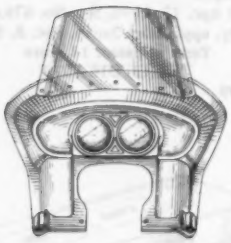
244,519
MOTORCYCLE SAFETY BAR
Harold H. Larsen, Long Beach, and Robert E. Oehring, Norwalk, both of Calif., assignors to Bates Industries, Inc., Long Beach, Calif.
Filed Sept. 24, 1973, Ser. No. 400,396
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—114



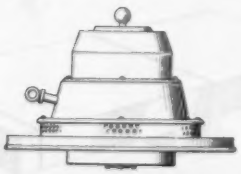
244,520
INFANT'S SEAT OR SIMILAR ARTICLE
Robert E. Burridge, Mount Lebanon, Pa., assignor to Contourpedic Corporation, Saddle Brook, N.J.
Filed Jan. 9, 1976, Ser. No. 647,706
Term of patent 14 years
Int. Cl. D12—*12*
U.S. Cl. D12—130

244,521
INFANT'S CHAIR OR SIMILAR ARTICLE
Robert E. Burridge, Mount Lebanon, Pa., assignor to Contourpedic Corporation, Saddle Brook, N.J.
Filed Jan. 9, 1976, Ser. No. 647,708
Term of patent 14 years
Int. Cl. D12—*12*
U.S. Cl. D12—130

244,522
MOTORCYCLE FAIRING
Craig W. Vetter, Rantoul, Ill., assignor to Vetter Design Works, Inc., Rantoul, Ill.
Filed Oct. 21, 1974, Ser. No. 516,628
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—182

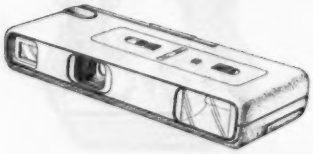


244,523
VACUUM CLEANER HEAD ASSEMBLY HOUSING
Adolfo Ednalino Ebalo, Medford, Mass., assignor to Purex Corporation Ltd., Lakewood, Calif.
Filed June 27, 1975, Ser. No. 591,028
Term of patent 14 years
Int. Cl. D15—*05*
U.S. Cl. D15—62

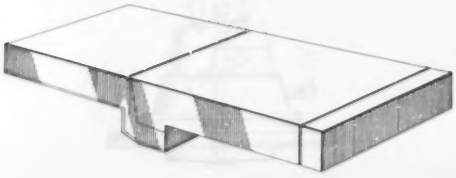


244,524
VACUUM CLEANER-BLOWER
John R. Howard, West Chicago, and Charles E. Nichols, Oak Park, both of Ill., assignors to Breuer Electric Mfg. Co., Chicago, Ill.
Filed Oct. 9, 1975, Ser. No. 620,942
Term of patent 14 years
Int. Cl. D15—*05*
U.S. Cl. D15—62

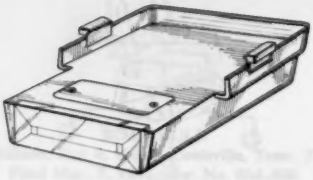
244,525
CAMERA
Masami Ishino, Kodaira, Japan, assignor to Sunpack Corporation, Tokyo, Japan
Filed Apr. 13, 1976, Ser. No. 676,625
Claims priority, application Japan, Dec. 5, 1975, 50-47458
Term of patent 14 years
Int. Cl. D16—*01*
U.S. Cl. D16—09



244,526
PHOTOGRAPHIC CAMERA BACK OR SIMILAR ARTICLE
Rolf M. Augustin, Jr., Wellesley, and Norman W. Cutler, Jr., Braintree, both of Mass., assignors to Polaroid Corporation
Filed Nov. 4, 1975, Ser. No. 628,462
Term of patent 14 years
Int. Cl. D16—*99*
U.S. Cl. D16—10



244,527
CAMERA FLASH ATTACHMENT
James T. Asaki, Elyria, Ohio, assignor to International Telephone and Telegraph Corporation, Nutley, N.J.
Filed Nov. 5, 1975, Ser. No. 629,152
Term of patent 14 years
Int. Cl. D16—*05*
U.S. Cl. D16—42



244,528
PAIR OF SPECTACLES
Richard M. Beane, Southbridge, Mass., assignor to American Optical Corporation, Southbridge, Mass.
Filed May 24, 1976, Ser. No. 689,231
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—65

244,529
PEN

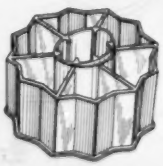
Francine Gomez, Paris, France, assignor to Waterman S.A., Paris, France

Filed Mar. 21, 1975, Ser. No. 560,982
Claims priority, application France, Oct. 22, 1974, 74.73278
Term of patent 14 years
Int. Cl. D19—*06*
U.S. Cl. D19—49

244,530
MODULE FOR A SEWAGE FILTER BED OR SIMILAR ARTICLE

John Bell, West Vancouver, Canada, assignor to Bell and Reading Engineering Ltd. and Fraser Valley Milk Producers Association, both of Vancouver, Canada

Filed Oct. 7, 1975, Ser. No. 620,397
Claims priority, application Canada, Apr. 11, 1975, 1104755
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—4



244,531
SPRAYER

Richard James Klingaman, Darien, Conn., assignor to Colgate-Palmolive Company, New York, N.Y.

Filed Feb. 26, 1976, Ser. No. 661,673
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—18

244,532
WATER SWEEPER

George L. Poston, 10911 Dennis Road, Dallas, Tex. 75225

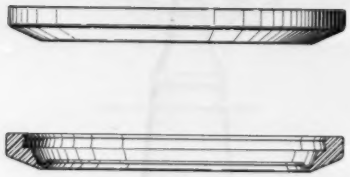
Filed Feb. 23, 1976, Ser. No. 660,107
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—35

244,533

WATER RESISTANT GASKET FOR CONDUITS AND THE LIKE

Jonah Eidelberg, Huntington Station; Thomas Mooney, Mt. Sinai, both of N.Y., and Richard A. Bauer, Etters, Pa., assignors to ITE Imperial Corporation, East Farmingdale, N.Y.

Filed June 11, 1975, Ser. No. 585,788
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—47

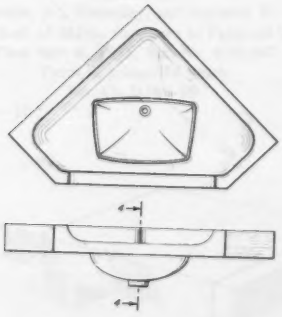


244,534

SINK

George S. Gruber, Hidden Hills, Calif., assignor to Dimensionetix, Inc., N. Hollywood, Calif.

Filed May 28, 1976, Ser. No. 690,861
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—63

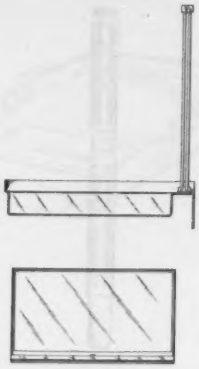


244,535

COMBINED SHOWER STALL BASE AND SLIDING DOOR UNIT OR THE LIKE

Troy L. Doan, 924 Phillips, Vista, Calif. 92083

Continuation-in-part of Ser. No. 453,777, Aug. 22, 1974, abandoned. This application May 5, 1975, Ser. No. 574,276
The portion of the term of this patent subsequent to Jan. 8, 1991, has been disclaimed.
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—49

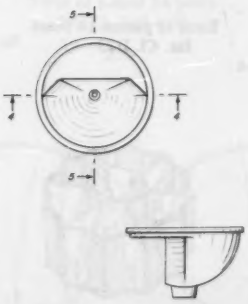


244,536

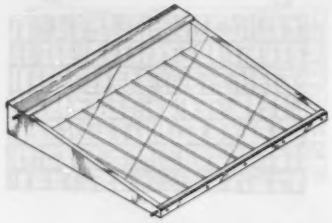
WASH BASIN

George S. Gruber, Hidden Hills, Calif., assignor to Dimensionetix, Inc., N. Hollywood, Calif.

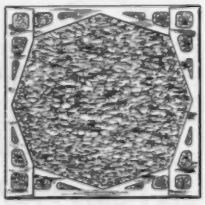
Filed May 28, 1976, Ser. No. 691,034
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—58



244,537
SOLAR BOOSTER WATER HEATER
Harry John Riley, Perth, Australia, assignor to S. W. Hart & Co. Pty. Ltd., Australia
Filed Sept. 17, 1975, Ser. No. 614,091
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—127

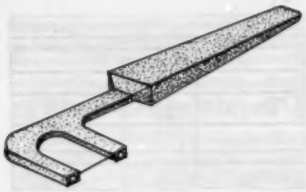


244,538
AIR FILTER, OR SIMILAR ARTICLE
Charles E. Wharton, Lake Forest, and Clarence Bell, Chicago, both of Ill., assignors to Korhumel Industries, Inc.
Filed May 7, 1975, Ser. No. 575,459
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—149

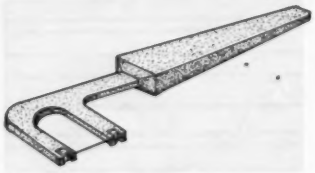


244,539
INSULATING COVER FOR A BUILDING VENT OPENING
Bennie Lee Mulligan, 4211 Oak Forest Drive, Charlotte, N.C. 28215
Filed Sept. 24, 1975, Ser. No. 616,423
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—163

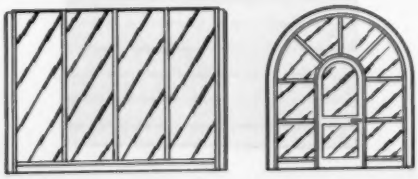
244,540
DENTAL FLOSS HOLDER
Joseph C. Dennesen, 62 Bridge St., Beverly, Mass. 01906, and Colin F. Chisholm, 19 Floyd Ave., Lynn, Mass. 01904
Filed Apr. 2, 1975, Ser. No. 564,230
Term of patent 14 years
Int. Cl. D28—*01*; D24—*99*
U.S. Cl. D28—64



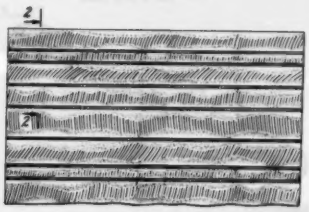
244,541
DENTAL FLOSS HOLDER
Joseph C. Dennesen, 62 Bridge St., Beverly, Mass. 01906, and Colin F. Chisholm, 19 Floyd Ave., Lynn, Mass. 01904
Filed Apr. 2, 1975, Ser. No. 564,662
Term of patent 14 years
Int. Cl. D24—*99*
U.S. Cl. D28—64



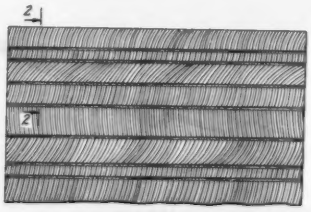
244,542
GREENHOUSE
Gyo Obata, St. Louis, Mo., assignor to Tiffany Industries, Inc., St. Louis, Mo.
Filed May 27, 1975, Ser. No. 581,154
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—15



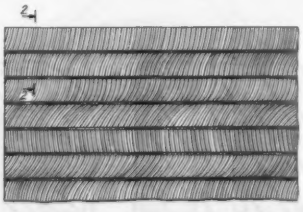
244,543
WALL PANEL
Stephen J. Tellman, Towners, and Oscar Selber, Carmel, both of N.Y., assignors to Champion International Corporation, Stamford, Conn.
Filed Jan. 17, 1975, Ser. No. 541,700
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—85



244,544
WALL PANEL
Stephen J. Tellman, Towners, and Oscar Selber, Carmel, both of N.Y., assignors to Champion International Corporation, Stamford, Conn.
Filed Jan. 17, 1975, Ser. No. 541,702
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—85

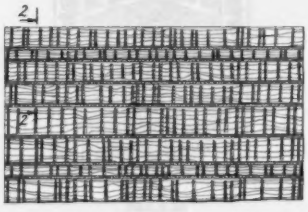


244,545
WALL PANEL
Stephen J. Tellman, Towners, and Oscar Selber, Carmel, both of N.Y., assignors to Champion International Corporation, Stamford, Conn.
Filed Jan. 17, 1975, Ser. No. 541,703
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—85

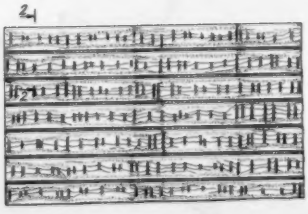


244,546
WALL PANEL
Stephen J. Tellman, Towners, and Oscar Selber, Carmel, both of N.Y., assignors to Champion International Corporation, Stamford, Conn.
Filed Jan. 17, 1975, Ser. No. 541,778
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—85

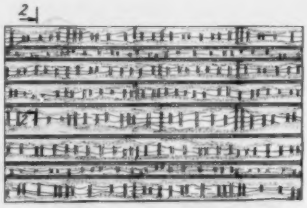
244,547
WALL PANEL
Stephen J. Tellman, Towners, and Oscar Selber, Carmel, both of N.Y., assignors to Champion International Corporation, Stamford, Conn.
Filed Jan. 17, 1975, Ser. No. 541,779
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—85



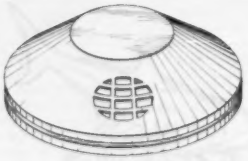
244,548
WALL PANEL
Stephen J. Tellman, Towners, and Oscar Selber, Carmel, both of N.Y., assignors to Champion International Corporation, Stamford, Conn.
Filed Jan. 17, 1975, Ser. No. 541,780
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—85



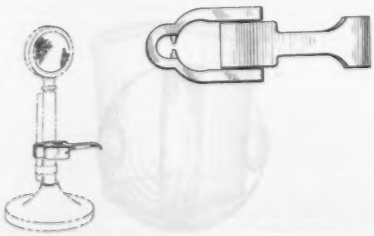
244,549
WALL PANEL
Stephen J. Tellman, Towners, and Oscar Selber, Carmel, both of N.Y., assignors to Champion International Corporation, Stamford, Conn.
Filed Jan. 17, 1975, Ser. No. 541,805
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—85



244,550
HOUSING FOR A FLUSH MOUNTED STEREO SPEAKER
Donn A. Zuroski, 4032 Izard St., (Apt. No. 2), Omaha, Nebr. 68131
Filed Aug. 7, 1975, Ser. No. 602,558
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—37

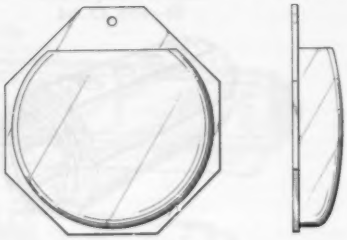


244,551
MICROPHONE KEY
Harry L. Weiss, Downers Grove, Ill., assignor to Harry L. Weiss, Downers Grove, Ill.
Filed Oct. 23, 1975, Ser. No. 625,151
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—12



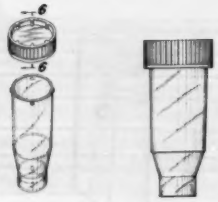
244,552
LIGHTER CASING
Martin Stringer, London, England, assignor to Ronson Corporation, Woodbridge, N.J.
Filed Jan. 30, 1976, Ser. No. 653,962
Claims priority, application United Kingdom, Aug. 4, 1975, 972064/75
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—42

244,553
WALL MOUNTABLE AQUARIUM OR SIMILAR ARTICLE
Tony Robert, 5701 Southwest Freeway, Houston, Tex. 77057
Filed Mar. 10, 1975, Ser. No. 557,038
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—7

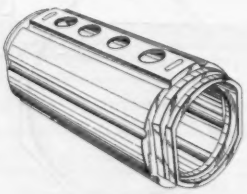


244,554
LIQUID SPECIMEN TUBE
William Earl Jones, and Robert Fritch Myers, both of Naperville, Ill., assignors to Miles Laboratories, Inc., Elkhart, Ind.
Filed Aug. 15, 1975, Ser. No. 605,165
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—55

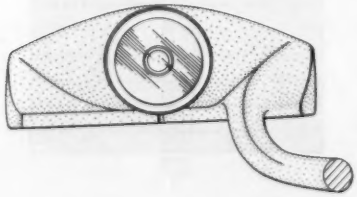
244,555
COVERED TEST TUBE
Gerhard Wiedmann, Butzberg, Switzerland, assignor to Greiner Electronic AG, Langenthal, Switzerland
Filed Sept. 19, 1975, Ser. No. 615,070
Claims priority, application Switzerland, Mar. 25, 1975, 121.006.052; Mar. 25, 1975, 121.006.053
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—23



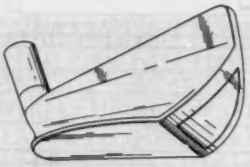
244,556
PLAYGROUND CLAMBER TUBE
Kenneth Peter Burgess, Kew Surrey, and Timothy Sefton Elsdale, London, both of England, assignors to WCB Containers Limited, Stalybridge, England
Filed Aug. 19, 1975, Ser. No. 605,894
Term of patent 14 years
Int. Cl. D21—*03*
U.S. Cl. D34—5 H



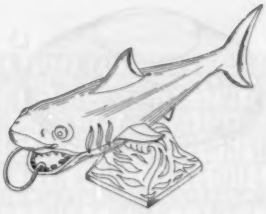
244,557
GOLF CLUB HEAD
Walter Parkoma, 27642 Barkley, Livonia, Mich. 48154
Filed Feb. 9, 1976, Ser. No. 656,331
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GH



244,558
GOLF CLUB HEAD
Vance V. Elkins, Jr., Freehold, N.J., assignor to Pratt-Read Corporation, Ivoryton, Conn.
Filed Nov. 11, 1975, Ser. No. 631,164
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GH



244,559
GAME SPINNER
Herbert R. Wells, and Mary M. Wells, both of 1458 La Riata Drive, Whittier, Calif. 90603
Filed Dec. 18, 1975, Ser. No. 641,722
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 MM



244,560
CLINGING GAME BALL
Joseph B. Derrington, 15652 Parthenia St., Sepulveda, Calif. 91343
Filed Sept. 12, 1975, Ser. No. 612,673
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 EE

244,561
EXPLOSION PROOF FLUORESCENT LAMP FOR MINES OR THE LIKE

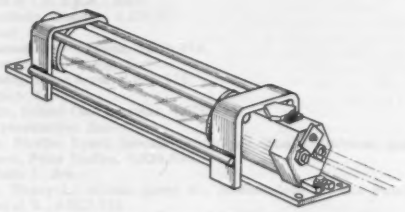
Perfecto Dacal, Beckley, W. Va., assignor to Control Products Inc., Beckley, W. Va.

Filed Apr. 26, 1976, Ser. No. 680,048

Term of patent 14 years

Int. Cl. D26—*05*

U.S. Cl. D48—20 E



244,562
DISPENSING CONTAINER FOR PAPER TOWELS OR THE LIKE

Bengt Georg Hagglund, Floda, and Bengt Sigvard Göransson, Kungsor, both of Sweden, assignors to Plat & Entreprenadieknik AB, Lerum, Sweden

Continuation-in-part of Ser. No. 285,429, Aug. 31, 1972, abandoned. This application May 15, 1975, Ser. No. 577,741

Claims priority, application Sweden, Mar. 1, 1972, 375/72

Term of patent 7 years

Int. Cl. D9—*99*

U.S. Cl. D52—2 C

244,563
GASOLINE DISPENSER

Kenneth W. Taylor, Maldon; Michael W. Ramsey, Witham; Stuart J. L. Poore, Leigh-on-Sea; Jack C. Samson, Basildon, all of England, and David D. Tompkins, Columbus, Ohio, assignors to Gilbarco Limited

Filed June 30, 1975, Ser. No. 591,308

Claims priority, application United Kingdom, Dec. 31, 1974, 969226/74

Term of patent 14 years

Int. Cl. D20—*01*

U.S. Cl. D52—2 A

244,564
CLOCK RADIO

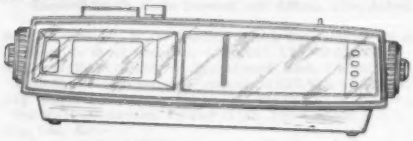
John S. Kolwaite, Dewitt, N.Y., assignor to General Electric Company

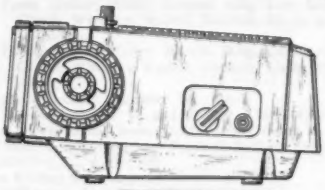
Filed May 30, 1975, Ser. No. 582,476

Term of patent 14 years

Int. Cl. D14—*03*

U.S. Cl. D24—73





244,565
DATA PROCESSING CARD HOLDER

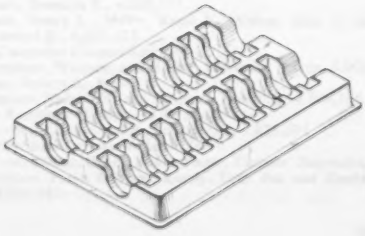
Stephen G. Bettum, 7705 14th Ave., Brooklyn, N.Y. 11228

Filed Sept. 11, 1975, Ser. No. 612,233

Term of patent 14 years

Int. Cl. D3—*99*

U.S. Cl. D87—1 R



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 31ST DAY OF MAY, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. E. Staley Manufacturing Company: *See—*
Hurst, Thomas L., 4,026,764.

A. Finkl & Sons Company: *See—*
Finkl, Charles W.; and Lehman, Albert L., 4,026,727.

A/S Kongsberg Vapenfabrik: *See—*
Andvig, Tore A., 4,026,239.

A. Tonolli & Co. S.p.A.: *See—*
Tremolada, Gustavo, 4,026,477.

AB Calator: *See—*
Harjapaa, Osmo Viljam, 4,026,444.

AB Gotaverken Company: *See—*
Genberg, Hans-Arvid, 4,026,232.

AB Teleplan: *See—*
Wallin, Erland Olof Ingemar, 4,026,635.

Abbott Laboratories: *See—*
Winn, Martin; Kyncl, Jaroslav; Dunnigan, Daniel Ambrose; and Jones, Peter Hadley, 4,026,894.

Abdou, John J.: *See—*
Peek, Henry L.; Mehta, Kanti V.; Abdou, John J.; and Patel, Amrut R., 4,027,125.

Abe, Nobuyuki; Yanashima, Ikuo; and Ohiwa, Kenjiro, to Nippon Concrete Industries Co. Ltd. Connected part of concrete pipe. 4,026,582, Cl. 285-45.000.

Abels, Theodor, to Linde Aktiengesellschaft. Lift-vehicle assembly. 4,026,432, Cl. 214-672.000.

Abrahams, Louis; and Russo, Manuel A., to Waters Associates. Chromatographic column with improved end fittings. 4,026,803, Cl. 210-198.00C.

Abramova, Ljudmila Nikolaevna: *See—*
Kaluzhsky, Nikolai Andreevich; Rubinchik, Faitel Markovich; Nasyrov, Gakif Zakirovich; Kaim, German Abramovich; Averin, Vitaly Mikhailovich; Milrud, Savely Mikhailovich; Telyatnikov, Garry Vladimirovich; Lyakhov, Viktor Prokhorovich; Abramova, Ljudmila Nikolaevna; Tarasov, Vladimir Ivanovich; Denisov, Vladislav Mikhailovich; Nasyrov, Dinam Latypovich; Stolyar, Boris Alexandrovich; Tagiev, Muzafar Suleiman-ogly; Lagno, Vladimir Ivanovich; and Kostin, Vladimir Nikolaevich, 4,026,672.

Abreu, Vasco O. Wheelchair lift. 4,026,387, Cl. 187-9.00R.

ACF Industries, Incorporated: *See—*
Jones, Thomas M., 4,026,001.

Acme-Hamilton Manufacturing Corporation: *See—*
Leone, Anthony R.; and Yakim, Andrew, 4,026,003.

Adams, David; and Smiltneck, Ralmond J., to S&S Corrugated Paper Machinery Co., Inc. Sheet end cutter and stripper. 4,026,199, Cl. 93-36.00A.

Adams, James S.; Peck, William H.; and Tekulve, Daniel R., to Hill-Rom Company, Inc. Elevating and Trendelenburg mechanism for an adjustable bed. 4,025,972, Cl. 5-68.000.

Adams, Phillip: *See—*
Weiss, Marvin; Adams, Phillip; Nass, Gerald I.; and Leitner, Roland L., 4,026,939.

Addressograph Multigraph Corporation: *See—*
Rasekhi, Houshang, 4,026,700.

Adler, Norman; Camin, Leopoldo Lazaro; and Gold, Paul, to New England Nuclear Corporation. Diagnostic agents. 4,027,005, Cl. 424-1.000.

AEG-Kanis Turbinenfabrik GmbH: *See—*
Deinlein-Kalb, Hans, 4,026,327.

Agence Nationale de Valorisation de la Recherche (ANVAR): *See—*
Lambla, Morand; and Terrisse, Jean, 4,026,962.

Agency of Industrial Science & Technology: *See—*
Iguchi, Masatoshi, 4,026,873.
Nakabayashi, Takashi; and Kagawa, Hiroshi, 4,027,075.

AGFA-Gevaert A.G.: *See—*
Vesper, Rainer, 4,027,316.

AGFA-GEVAERT, N.V.: *See—*
Evens, Georges Gerard; and Smets, Georges Joseph, 4,026,869.
Vanassche, Willy Joseph; Pollet, Robert Joseph; Willems, Jozef Frans; Vandenberghe, Antoon Leon; Berendsen, Jules Robert; and Pattyn, Herman Alberik, 4,026,708.

Agnew, S. J.: *See—*
Jones, Allen Jacob, 4,026,247.

Ahern, William W.; and Mathe, Birgit T., to GeoMetrics. Spherical structural arrangement. 4,026,078, Cl. 52-81.000.

Ahmer, Joseph C. Decorative device for converting street shoes to dress shoes. 4,026,047, Cl. 36-136.000.

Ahrens, Karl-Heinrich: *See—*
Knusting, Gregor; and Ahrens, Karl-Heinrich, 4,026,093.

Aichinger, Horst; and Sladek, Walter, to Siemens Aktiengesellschaft. Radiological measuring arrangement. 4,027,166, Cl. 250-416.00R.

Aidn, Martin; and Rappl, Franz, to Siemens Aktiengesellschaft. Spring contact assembly. 4,027,131, Cl. 200-246.000.

Air Products and Chemicals, Inc.: *See—*
Bechara, Ibrahim S.; Carroll, Felix P.; and Mascioli, Rocco L., 4,026,840.
Lovette, Norris G., Jr, Norris G., 4,025,990.

Aishima, Itsuho; Sakurai, Hisaya; Takashi, Yukichi; Morita, Hideo; Ikegami, Tadashi; and Sato, Toshio, to Asahi Kasei Kogyo Kabushiki Kaisha. Process for polymerizing ethylene. 4,027,089, Cl. 526-127.000.

Ajisawa, Yukiyoshi: *See—*
Harita, Kozaburo; Ajisawa, Yukiyoshi; Iizuka, Kinji; Toda, Michio; Kinoshita, Yukihiko; Kamijo, Tetsuhide; and Kobayashi, Michihiro, 4,026,896.

Akabane, Morizi, to Hori Glass Co., Ltd. Window pane holder. 4,026,088, Cl. 52-628.000.

Akae, Kiyosi, to Unitika Ltd. Waste water treatment apparatus by biological action. 4,026,802, Cl. 210-151.000.

Akhagen, Rune Verner; Tisell, Claes Gustav Erik Yngve; and Andersson, Anders Hakan, to Forenade Fabriksverken. Projectile locking device. 4,026,189, Cl. 89-1.703.

Akimoto, Hiroshi: *See—*
Sugimoto, Keiichi; Nishijima, Koji; Akimoto, Hiroshi; Hanaoka, Tadashi; and Kakeya, Nobuharu, 4,026,940.

Aktiengesellschaft Gebruder Loepfe: *See—*
Domig, Rene; and Weidmann, Erich, 4,027,232.

Albert, Frank D.; Conroy, Alan P.; and Skinner, David L., to Jim Walter Corporation. Process for making uniform short non-cellulosic fibers. 4,026,478, Cl. 241-24.000.

Albert, William Charles; and Zoltan, Bart Joseph, to Singer Company, The. Temperature compensation for a damped fluid proof mass accelerometer. 4,026,158, Cl. 73-497.000.

Alcorn, Ward C., III: *See—*
Clemmer, Clyde C.; and Alcorn, Ward C., III, 4,027,085.

Aldous, John Alfred William: *See—*
Stanwell-Smith, Colin Howard; and Aldous, John Alfred William, 4,026,611.

Ales, Thomas M., Jr., to Kimberly-Clark Corporation. Drum unwind system for sheet materials. 4,026,487, Cl. 242-65.000.

Alig, Leo; Furst, Andor; Muller, Marcel; Kerb, Ulrich; and Wiechert, Rudolf. D-Homo-pregnene steroids. 4,026,922, Cl. 260-488.00B.

Alig, Leo; Furst, Andor; and Muller, Marcel, to Hoffmann-La Roche Inc. D-Homosteroids. 4,026,923, Cl. 260-488.00B.

Alig, Leo: *See—*
Furst, Andor; Muller, Marcel; Alig, Leo; Keller, Peter; Kerb, Ulrich; Wiechert, Rudolf; Kieslich, Klaus; and Petzoldt, Karl, 4,026,918.
Furst, Andor; Muller, Marcel; Alig, Leo; Keller, Peter; Kerb, Ulrich; Wiechert, Rudolf; Kieslich, Klaus; and Petzoldt, Karl, 4,026,921.

Allegheny Ludlum Industries, Inc.: *See—*
Zaremski, Donald R.; and Krepler, Albert, 4,026,777.

Allen, Barrie Alistair James; Allen, John Grimes; Sheppard, John; and Wilson, Dermot Needham Furnival. Pack for fishing line dispensing. 4,026,063, Cl. 43-54.50R.

Allen-Bradley Company: *See—*
Wilkerson, Alan W., 4,027,220.

Allen, Ellsworth J.: *See—*
Wise, Walter R.; Allen, Ellsworth J.; and Fisher, Donald K., 4,026,748.

Allen, John Grimes: *See—*
Allen, Barrie Alistair James; Allen, John Grimes; Sheppard, John; and Wilson, Dermot Needham Furnival, 4,026,063.

Allen, Joseph C., to Texaco Inc. Method of in situ recovery of viscous oils and bitumens. 4,026,358, Cl. 166-261.000.

Allen, Robert J.: *See—*
Hahn, Kurt L.; and Allen, Robert J., 4,026,226.

Allis-Chalmers Corporation: *See—*
Jones, Kenneth R., 4,026,377.
Peek, Henry L.; Mehta, Kanti V.; Abdou, John J.; and Patel, Amrut R., 4,027,125.

Alpex Computer Corporation: *See—*
Kirschner, Wallace; and Haskel, Lawrence Martin, 4,026,555.

Altmann, Robert S.: *See—*
Johnson, Robert D.; and Altmann, Robert S., 4,026,355.

Aluflex Partitions (Eastern 1970) Ltd.: *See—*
Delaney, Leo L.; and Barker, Harold, 4,026,081.

Aluminiumipari Tervezo Vallalat: *See—*
Orban, Ferenc; Orban, Maria; Pinter, Tihamer; Zaigmond, Gyorgy; Siklosi, Peter; Solymar, Karoly; Toth, Pal; and Zambo, Janos, 4,026,989.

Aluminum Company of America: *See—*
Bartelt, Alan R., 4,026,495.
Aluminum Systems Limited: *See—*
Goose, Alan Charles, 4,026,084.
Amano, Shoichi: *See—*
Ezaki, Norio; Amano, Shoichi; Miyado, Shinji; Ito, Mitsugu; Nojiri, Chuhei; Tsuruoka, Takashi; Yamada, Yujiro; and Niida, Taro, 4,027,014.
Amax Inc.: *See—*
Nikolic, Cvetko B.; and Laferty, John M., 4,026,797.
Ambrose, Arnold A. Plans carrier. 4,026,485, Cl. 242-55.000.
Ambrosio, Biagio F., to Telautograph Corporation. Thermal writing power. 4,027,311, Cl. 346-76.00R.
Amerace Corporation: *See—*
Waddington, William T.; and Jenkins, Harold F., 4,027,096.
American Can Company: *See—*
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Andoniev, Sergei Mikhailovich; Kudinov, Gennady Alexandrovich; Kutsykovich, Dorina Borisovna; Kasyanov, Grigory Ivanovich; Raikovsky, Jury Borisovich; Filipiev, Oleg Vladimirovich; Freidenzon, Evgeny Zakharovich; and Pustovar, Vladimir Semenovich. Device for evaporative cooling of metallurgical units. 4,026,352, Cl. 165-95.000.
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Appelbaum, Jacob; and Feldman, Martin, to Bell Telephone Laboratories, Incorporated. Proximity printing method. 4,026,653, Cl. 355-132.000.
Appelhans, Antonius Friedrich; Robers, Felix Franz; and Stemick, Ulrich, to Nino Aktiengesellschaft. Method and apparatus for the manufacture of collar-inserts and base-plus seal-inserts for performance of this method. 4,026,749, Cl. 156-252.000.
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Bagley, Edward B.; Fanta, George F.; Doane, William M.; Gugliemelli, Lewis A.; and Russell, Charles R., to United States of America, Agriculture. Composite compositions from graft polymerized rigid fillers. 4,026,849, Cl. 260-17.4GC.
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Barnwell, J. H.; and Wilkinson, M. T., to Department of Mechanical Engineering Louisiana Tech University. Shock absorber. 4,026,534, Cl. 267-139.000.
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Bartholomew, Roger F., to Corning Glass Works. Press molding optical articles from acid hydrated glasses. 4,026,692, Cl. 65-30.00R.
Barton, Robert Stanley; and Hodgman, Gary Wesley, to Burroughs Corporation. Self-managing variable field storage system for handling nested data structures. 4,027,288, Cl. 340-172.500.
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Beck, Gunther; Doring, Fritz; and Holtschmidt, Hans, to Bayer Aktiengesellschaft. Process for the preparation of tetrachloropyrimidine. 4,026,892, Cl. 260-251.00R.

Becker, Danny J.; Boggs, Roger L.; Vaughn, Kenneth E.; and Shuler, James Richard, to Caterpillar Tractor Co. Low ground pressure track shoe. 4,026,608, Cl. 305-54.000.

Becker, Joseph J.; Schulte-Elte, Karl-Heinrich; Strickler, Hugo; and Ohloff, Gunther, to Firmenich S.A. Process for the preparation of 2,2,6-trimethyl-cyclohex-5-en-1,4-dione. 4,026,948, Cl. 260-586.00P.

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Berghofer, Hans. Flexible pipe coupling. 4,026,585, Cl. 285-229.000.

Bergman, Clark, to United States of America, Air Force. Tubular plasma display seal design. 4,027,188, Cl. 313-220.000.

Bergman, Norman J., to Xerox Corporation. Apparatus and method for measurement of the ratio of toner particle electrostatic charge to toner particle mass in electrostatographic devices. 4,026,643, Cl. 355-3.0DD.

Berkelhammer, Gerald: *See—*
Asato, Goro; Berkelhammer, Gerald; and Gastrock, William Henry, 4,026,903.

Berky, Denes; Damokos, Tamas; Havas, Jeno; and Muller, Henrik, to Radelkis Elektrokemial Muszergyarto Szovetkezet. Coulometric measuring method. 4,026,774, Cl. 204-1.00T.

Bernstein, Seymour; and Lenhard, Robert Herman, to American Cyanamid Company. Complement inhibitors. 4,027,038, Cl. 424-315.000.

Berry, Jean-Luc: *See—*
Dardaine, Edgar; Berry, Jean-Luc; Siard, Michel; and Pellerin, Daniel, 4,026,982.

Berry, John F.: *See—*
Barcus, Lester M.; and Berry, John F., 4,026,181.

Berz, Wolfgang. Dust separator arrangement. 4,026,687, Cl. 55-288.000.

Best, Walter E. High security lock. 4,026,132, Cl. 70-9.000.

Betco Block & Products, Inc.: *See—*
Hoyt, Peter B.; and Schuyler, Stephen V. C., 4,026,083.

Betzler, Hermann, to Salvia-Werk Gesellschaft m.b.H. Circular slide rule suitable for use in determining the electrolyte deficiency in infusion therapy. 4,026,463, Cl. 235-88.00R.

Betzler, Otto, to Michael Weinig KG. Tool grinding machine. 4,026,073, Cl. 51-100.00R.

Bevacqua, Louis Albert, to Motorola, Inc. Unitized push/pull double pole single throw switch. 4,027,122, Cl. 200-77.000.

Beyerlein, Fritz W.: *See—*
Drees, Joseph M.; and Beyerlein, Fritz W., 4,026,008.

Beyers, Billy Wesley, Jr., to RCA Corporation. Transducer drive circuit for remote control transmitter. 4,027,280, Cl. 340-15.000.

Beyl, Volker: *See—*
Schneider, Siegfried; Weis, Wolfgang; Beyl, Volker; and Niederprum, Hans, 4,026,997.

Biava, Bruno. Thermal retention food storage containers. 4,026,351, Cl. 165-58.000.

Bick, Rodger L.; and Fekete, Lajos F., to Wilson, William L.; Bick, Rodger L.; and Fekete, Lajos F. Clottable fibrinogen free factor VIII and albumin product and process. 4,027,013, Cl. 424-101.000.

Biddle, Howard William, to Cambridge Consultants Ltd. Seed drill. 4,026,437, Cl. 221-211.000.

Biedermann, Wolfgang: *See—*
Scharfe, Gerhard; Wenzel, Rupert; and Biedermann, Wolfgang, 4,026,770.

Bieri, Hans, to H. Bieri AG, Liebefeld. Apparatus for mechanically breaking up stone or reinforced concrete. 4,026,602, Cl. 299-22.000.

Billman, Fred L.; and Lee, Hung-Hee H., to S. C. Johnson & Son, Inc. Di-mixed alky aspartate salts. 4,026,915, Cl. 260-471.00A.

Birat, Jean Pierre; and Vedda, Louis, to Institut de Recherches de la Siderurgie Francaise (IRSID). Liquid-cooled mold for continuous casting of molten metal. 4,026,346, Cl. 164-147.000.

Birdwell, Daniel Lee. Spring type exercise device. 4,026,548, Cl. 272-136.000.

Bisbing, Robert H.; and Vickers, James H., to Southco, Inc. Push-to-open magnetic catch. 4,026,588, Cl. 292-251.500.

Bisey, Robert P. Table saw wood edging alignment tool. 4,026,175, Cl. 83-442.000.

Bishop, Stephen G., to United States of America, Navy. Combined use of visible and near-IR imaging systems with far-IR detector system. 4,027,159, Cl. 250-338.000.

Bittel, Raymond H.; Helm, Harry A.; and Raffensperger, Maurice J., to United States of America, Army. Frequency generator. 4,027,263, Cl. 328-151.000.

Bjornson, Geir, to Phillips Petroleum Company. Azeotropic distillation of 1,1,1,3,3,3-hexafluoroisopropyl trifluoroacetate with fluorotrichloromethane. 4,026,930, Cl. 260-539.00A.

Blaha, Erich; Lang, Walter; and Mueller, Ortwin, to Carl Zeiss-Stiftung. Photocoagulator. 4,026,293, Cl. 128-303.100.

Blair, James F.: *See—*
Paup, Robert E.; and Blair, James F., 4,027,142.

Blair, Oather. Mortar sighting device. 4,026,190, Cl. 89-41.00B.

Blakeney, Herbert K.; Goldie, Harry; and Savoie, Ronald W., to Westinghouse Electric Corporation. Fast recovery time receiver protector for radars. 4,027,255, Cl. 333-13.000.

Blanchard, Richard Lewis, to American Can Company. Plastic container closure. 4,026,459, Cl. 229-43.000.

Blanco, Ernesto E., to Universal Textile Machine Corporation. Faulty needle sensing. 4,026,128, Cl. 66-165.000.

Blank, Heinz Ulrich: *See—*
Bohm, Walter; Blank, Heinz Ulrich; Skipka, Guido; and Durholz, Friedrich, 4,026,944.

Blank, Werner Josef: *See—*
Parekh, Girish Girdhar; and Blank, Werner Josef, 4,026,855.

Blanshine, Allison W.; Eggers, Edward T.; and Hyman, Myles, to Sperry Rand Corporation. Hay roll forming machine. 4,026,205, Cl. 100-88.000.

Blaupunkt-Werke GmbH: *See—*
Heppner, Paul; and Pohlmann, Gottfried, 4,027,112.

Blomquist, Robert E., to Sundstrand Corporation. Machine tool. 4,026,191, Cl. 90-11.00D.

Blomstrom, Gary D., to Caterpillar Tractor Co. Tilting operator platform safety lock. 4,026,380, Cl. 180-89.120.

Blume, Erich; and Schornig, Eberhard, to Hoechst Aktiengesellschaft. Device for applying pressure to stacked articles. 4,026,438, Cl. 221-231.000.

Boag, John, to Ford Motor Company. Locking structure for electrical connectors. 4,026,624, Cl. 339-91.00R.

Bodine, Albert G. Sonic compressing device utilizing multiple gyratorily vibrated drive bars. 4,026,481, Cl. 241-266.000.

Boehringer Ingelheim GmbH: *See*—
Austel, Volkhard; Kutter, Eberhard; Heider, Joachim; Eberlein, Wolfgang; Kadatz, Rudolf; and Diederen, Willi, 4,026,891.

Boehringer, John R. Pressure relief valve for anesthetic administration. 4,026,284, Cl. 128-188.000.

Boeing Company, The: *See*—
James, Varnell L., 4,026,105.

Boetto, Charles: *See*—
Andersson, Ingemar R.; and Boetto, Charles, 4,026,365.

Bogachenko, Alexei Georgievich: *See*—
Shmakov, Eduard Ivanovich; Medovar, Boris Izrailevich; Chvertko, Anatoly Ivanovich; Koval, Vladimir Vasilievich; Fedotenkov, Vyacheslav Georgievich; Bondarenko, Oleg Petrovich; Kravchuk, Anatoly Iosifovich; Marchenko, Alexandr Mikhailovich; and Bogachenko, Alexei Georgievich, 4,027,233.

Bogdanski, John J.; and Silverman, Harold, to Pitney-Bowes, Inc. Double adhesive tape applying apparatus. 4,026,754, Cl. 156-521.000.

Boggs, Roger L.: *See*—
Becker, Danny J.; Boggs, Roger L.; Vaughn, Kenneth E.; and Shuler, James Richard, 4,026,608.

Bognar, Rezso: *See*—
Knoll, Jozsef; Furst, Zsuzsanna; Meszaros, Zoltan; Szentmiklosi, Peter; David, Agoston; Hermecz, Istvan; Mandi, Attila; Bognar, Rezso; Makleit, Sandor; Valovics, Gyula; Szavik, Laszlo; and Nagy, Sandor, 4,027,024.

Boguth, Walter; Leuenberger, Hans Georg Wilhelm; Mayer, Hans Johann; Widmer, Erich; and Zell, Reinhard, to Hoffmann-La Roche Inc. Optically active cyclohexane derivatives. 4,026,949, Cl. 260-598.000.

Bohm, Benno; Genth, Hermann; Schober, Peter; and Simons, Peter, to Bayer Aktiengesellschaft. Fining with aluminate-modified silica sol. 4,027,046, Cl. 426-330.300.

Bohm, Walter; Blank, Heinz Ulrich; Skipka, Guido; and Durholz, Friedrich, to Bayer Aktiengesellschaft. Process for manufacturing diaminonaphthalene. 4,026,944, Cl. 260-580.000.

Bohme, Ekkehard: *See*—
Dolfini, Joseph Edward; and Bohme, Ekkehard, 4,026,886.

Bohnett, Floyd Newell. Turnstile assembly. 4,026,069, Cl. 49-49.000.

Boiko, Georgy Alexandrovich: *See*—
Medovar, Boris Izrailevich; Kumysh, Ilya Iosifovich; Boiko, Georgy Alexandrovich; Grodzitsky, Stanislav Vitalievich; Arkhipov, Nikolai Vasilievich; and Skoropupov, Anatoly Nikolaevich, 4,027,092.

Boles, Bruce Aaron. Grocery shopping list. 4,026,050, Cl. 40-65.000.

Bolt Vehicles, Inc.: *See*—
Bonora, Anthony C.; and Ray, Lawrence L., 4,026,574.

Bondarenko, Oleg Petrovich: *See*—
Shmakov, Eduard Ivanovich; Medovar, Boris Izrailevich; Chvertko, Anatoly Ivanovich; Koval, Vladimir Vasilievich; Fedotenkov, Vyacheslav Georgievich; Bondarenko, Oleg Petrovich; Kravchuk, Anatoly Iosifovich; Marchenko, Alexandr Mikhailovich; and Bogachenko, Alexei Georgievich, 4,027,233.

Bonora, Anthony C.; and Ray, Lawrence L., to Bolt Vehicles, Inc. Combination kickstand and footrest. 4,026,574, Cl. 280-295.000.

Bontinck, Walter: *See*—
Cornille, Georges; Jacobs, Roland; and Bontinck, Walter, 4,026,718.

Borg-Warner Corporation: *See*—
Durum, Metin Mustafa, 4,026,123.
Norbeck, Dean King, 4,027,204.
Studtmann, George Henry, 4,027,226.
Washington, Richard C., 4,026,005.

Borrello, Sebastian R.; and Sawyer, Jimmy D., to Texas Instruments Incorporated. Schottky barrier phototransistor. 4,027,319, Cl. 357-15.000.

Borsuk, Leslie M.: *See*—
Goodman, David S.; and Borsuk, Leslie M., 4,026,623.

Bortkevich, Leonid Leonidovich; Burmistrov, Alexandr Georgievich; Karnet, Nikolai Sergeevich; Sevostyanov, Boris Alexandrovich; and Filatova, Tatyana Grigorievna. Apparatus for recovering bile from gall bladders of slaughtered beasts. 4,025,987, Cl. 17-43.000.

Boschet, Vittorio, to Grafosol S.p.A. Matrix supporting device in electrostatic development apparatus. 4,026,242, Cl. 118-657.000.

Bosio, Jean-Francois; and Spindler, Charles. Apparatus for storing and displaying articles. 4,026,617, Cl. 312-268.000.

Bosley, David Emerson, to Du Pont de Nemours, E. I., and Company. Production of yarn of polyester filaments having a random distribution along the filament length of thick and thin sections differing in dyeability. 4,026,098, Cl. 57-157.0TS.

Bosserman, David A.; and Freeman, Charles F., to United States of America, Army. Toric reflector display. 4,026,641, Cl. 350-298.000.

Bost, Howard W., to Phillips Petroleum Company. Intumescent flame retardants. 4,026,810, Cl. 252-8.100.

Bostroem, Theodore. Winder drums for strip slitting lines. 4,026,491, Cl. 242-72.00B.

Bottum, Edward W. Solar collector. 4,026,272, Cl. 126-271.000.

Bourganel, Jack, to Rhone-Poulenc S.A. Preparation of anisotropic semi-permeable membranes of polyaryl ether/sulphones. 4,026,977, Cl. 264-41.000.

Bourke, Thomas J.; and Buzzard, Kenneth J., to Westinghouse Air Brake Company. Transmitting loop arrangement for railroad cab signal and speed control system. 4,026,506, Cl. 246-34.00R.

Bourrat, Pierre; Gosset, Paul Xavier; Riss, Pierre; and Vignaud, Jean-Pierre, to Regie Nationale des Usines Renault. Numerically controlled machine tool. 4,027,245, Cl. 235-151.110.

Bouy, Pierre; de Lachaux, Hubert; and Conan, Michel, to Rhone-Poulenc Industries. Electrolysis cell having bipolar elements. 4,026,782, Cl. 204-254.000.

Bowditch, Philip N.; Toth, William E.; and Grossman, Arthur, to Charles Stark Draper Laboratory, Inc., The. Vertical displacement measuring apparatus. 4,026,156, Cl. 73-432.0HA.

Bown, Eric B.; Mueller, Harold P., III; and Robertson, Elton, to Information Design Corporation of America. Circular photographic slide tray. 4,026,645, Cl. 353-118.000.

Boyd, Charles M. Fireplace systems. 4,026,263, Cl. 126-121.000.

Brackbill, Warren H.: *See*—
Ipnar, Albert J.; and Brackbill, Warren H., 4,026,476.

Bradburn, Ronald G.; Flintoff, Brian C.; Walker, Robert A.; and Dutton, Walter A., to Brenda Mines Ltd. Method and system for maintaining optimum throughput in a grinding circuit. 4,026,479, Cl. 241-30.000.

Bradfield, Sydney P., III: *See*—
Kobayashi, Herbert S.; and Bradfield, Sydney P., III, 4,027,265.

Brandes, Wilhelm: *See*—
Daum, Werner; Behrenz, Wolfgang; Hammann, Ingeborg; Scheinpflug, Hans; and Brandes, Wilhelm, 4,026,934.

Brandolese, Ernesto: *See*—
Ciuti, Brunello; Angelini, Ferdinando; and Brandolese, Ernesto, 4,026,817.

Braun, Roland Joseph, to International Business Machines Corporation. Bubble memory package. 4,027,300, Cl. 340-174.0TF.

Braxton, Henry G., Jr.: *See*—
Kolich, Charles H.; Braxton, Henry G., Jr.; and Lehikoinen, Urho A., 4,026,964.

Breaux, Paul W.; Newman, Wendell D.; and Quinnett, Philip E., to Olin Corporation. Preparation of pentachloronitrobenzene. 4,026,955, Cl. 260-646.000.

Breisch, Harald: *See*—
Kuhnle, Willi; Wendler, Heinz; Glaser, Manfred; and Breisch, Harald, 4,026,169.

Brenda Mines Ltd.: *See*—
Bradburn, Ronald G.; Flintoff, Brian C.; Walker, Robert A.; and Dutton, Walter A., 4,026,479.

Brennan, Michael E.; Moss, Philip H.; and Yeakey, Ernest L., to Texaco Development Corporation. Production of bis-(morpholino-N-alkyl) ethers. 4,026,935, Cl. 260-246.00B.

Brewer, Arthur D.; Neidermyer, Robert W.; and McIntire, William S., to Uniroyal Inc.; and Uniroyal, Ltd. Substituted dithiin tetroxide plant growth regulants. 4,026,906, Cl. 260-327.00P.

Bridigum, Robert J., to Westinghouse Air Brake Company. Pressure reduction and pressure reduction rate sensitive emergency vent valve. 4,026,609, Cl. 303-82.000.

Bristol-Myers Company: *See*—
Kaplan, Murray A.; Gottstein, William J.; and Granatek, Alphonse P., 4,026,888.
Tomita, Koji; Kobaru, Seikichi; Hanada, Minoru; and Tsukiura, Hiroshi, 4,026,766.

British Aircraft Corporation Limited: *See*—
Rhodes, Arthur Neville, 4,026,503.

Britt, John Philip; and Wilson, Eric Henry. Plastics strips. 4,026,413, Cl. 206-343.000.

Brockett, Bruce W.; and Weaver, Frederick D., to NCR Corporation. Pressure-sensitive record material. 4,027,065, Cl. 428-307.000.

Brooke, Edric R., to Xerox Corporation. Sheet stripping device. 4,026,541, Cl. 271-174.000.

Brooker, Peter John; and Goose, John, to Fisons Limited. Method of administering medicaments through the skin. 4,026,290, Cl. 128-260.000.

Broughton, Dan Q.: *See*—
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Browder, Joe B.; Bythewood, R. Courtenay; and Hensley, Walter R., to Browder, Joe B.; and Hensley, Walter R. Power demand limiting system. 4,027,171, Cl. 307-39.000.

Brower, Van Pelt, to Monsanto Company. Roll finishing process. 4,026,007, Cl. 29-527.400.

Brown, Felix H.: *See*—
Schaufele, Robert F.; and Brown, Felix H., 4,027,191.

Brown, George L.; and Martinez, Carlos J., to Mobil Oil Corporation. Epoxy emulsion water-based coating. 4,026,857, Cl. 260-29.40R.

Brown, Kenneth H., to Motorola, Inc. Demodulator for PM or FM signals. 4,027,268, Cl. 329-142.000.

Brown, Michael A.; and Mol, Hans C., to Pitney-Bowes, Inc. Sheet pusher. 4,026,538, Cl. 271-42.000.

Brown, Ronald H.: *See*—
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Brown & Root, Inc.: *See*—
Cohn, Arnold S.; Rohde, Heinz K.; and Koehler, Albert M., 4,026,227.

Brown, Wallace E.; Proctor, James G.; and Armstrong, William H., to United States of America, Navy. Quick find grabber-mine recovery. 4,026,593, Cl. 294-66.00R.

Brown, William W.; Hanson, Delon C.; and Hornak, Thomas, to Hewl-

ett-Packard Company. Apparatus and method for transmitting binary-coded information. 4,027,152, Cl. 250-199.000.
Brownlee, Robert R.; Tyers, Frank O.; and Volz, Carl, Sr., to Research Corporation. Low current telemetry system for cardiac pacers. 4,026,305, Cl. 128-419.0PT.
Brunswick Corporation: *See—*
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Buchholz, Adolf. Apparatus for steam drying. 4,026,037, Cl. 34-57.00R.
Bue, Richard C.: *See—*
Wilson, Kermit H.; Bue, Richard C.; and Carlson, Ronald R., 4,026,221.
Buechner, Oskar; Unterstenhoefer, Leo, deceased (by Unterstenhoefer, Ilse, authorized representative of the heirs); Mueller-Tamm, Heinz; and Kroll, Wolfram Rainer, to BASF Aktiengesellschaft. Molding compositions based on bitumen and olefin copolymers. 4,026,854, Cl. 260-28.5AS.
Bullock, David Carl, to Texas Instruments Incorporated. Gapless magnetic bubble propagation path structure. 4,027,297, Cl. 340-174.0TF.
Burke, Ann M. Handbag protection. 4,026,339, Cl. 150-28.00R.
Burkhardt, Gottfried. Apparatus for the bodily shifting of a printing roller. 4,026,404, Cl. 197-73.000.
Burmistrov, Alexandr Georgievich: *See—*
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Fiorentino, Ermenegildo, 4,026,424.
Kril, Russell Stephen, 4,027,338.
Walton, Tommy L., 4,026,011.
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Schaeffer, Howard John, 4,027,025.
Burrow, Melvin. Apparatus for shutting off and controlling well blowouts. 4,026,354, Cl. 166-95.000.
Bussey, Harry, Jr. Loose fill packing element and method of making same. 4,027,064, Cl. 428-357.000.
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Byrd, William Jerry, to Centronics Data Computer Corporation. Incremental line printer. 4,026,402, Cl. 197-1.00R.
Bythewood, R. Courtenay: *See—*
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Cabrol, Yves, to Societe d'Exploitation des ets Coq. Pressing device working in continuous operation. 4,026,206, Cl. 100-117.000.
Caccoma, George Anthony; Castrucci, Paul Philip; and Druschel, William Otto, to International Business Machines Corporation. Automated integrated circuit manufacturing system. 4,027,246, Cl. 235-151.100.
Cady, Wayne A. Shooting support for rifle. 4,026,057, Cl. 42-94.000.
CAF Industries: *See—*
Reed, Richard E.; and Reed, Raymond E., 4,026,228.
Cain, John M., to Raymond Lee Organization, Inc., The, a part interest. Light bulb storage bank. 4,026,416, Cl. 211-26.000.
Calgon Corporation: *See—*
Logan, Douglas Patton, 4,026,667.
Callenberg, Russell J., to Grove Valve and Regulator Company. Pilot valve. 4,026,513, Cl. 251-61.100.
Calman, Kenneth J. Vehicle radio control unit. 4,027,249, Cl. 325-312.000.
Cambridge Consultants Ltd.: *See—*
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Carnes, James Edward; Dawson, Robert Herman; Fedorka, Robert Thomas; and Kaiser, Henry William, to RCA Corporation. Charge transfer circuits exhibiting low pass filter characteristics. 4,027,260, Cl. 333-70.00R.
Carney, Homer Charles, to General Atomic Company. Nuclear battery shock-support system. 4,026,726, Cl. 136-202.000.
Carr, George W., to Pullman Incorporated. Container hold down locking means. 4,026,596, Cl. 296-35.00A.
Carroll, Felix P.: *See—*
Bechara, Ibrahim S.; Carroll, Felix P.; and Mascioli, Rocco L., 4,026,840.
Cartier, George E.; and Snelgrove, James A., to Monsanto Company. Laminated safety glass. 4,027,061, Cl. 428-213.000.
Caruso, Andrew. Rollers with plural detents. 4,026,043, Cl. 35-77.000.
Case, Everett N., to Atlantic Richfield Company. Process for defluorination of commercial phosphoric acid. 4,026,995, Cl. 423-321.00R.
Cashin, Colin H.; Chakrabarti, Jiban K.; and Szinai, Stephen S., to Eli Lilly and Company. Therapeutic uses of adamantanealkylamine compounds. 4,027,035, Cl. 424-330.000.
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Cave, David L.; and Davis, Walter R., to Motorola, Inc. Capacitor structure and circuit facilitating increased frequency stability of integrated circuits. 4,027,271, Cl. 330-22.000.
CBS Inc.: *See—*
Kaiser, Arthur; Mahler, Henry W.; and McMann, Renville H., Jr., 4,027,333.
Cecchini, Giuliano. Stereoscopic films. 4,026,636, Cl. 350-135.000.
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Centronics Data Computer Corporation: *See—*
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Cessna, Lawrence C., Jr., to Hercules Incorporated. Thermosetting compositions containing poly(arylacetylenes). 4,026,859, Cl. 260-30.40R.
Cessna, Lawrence C., Jr., to Hercules Incorporated. Thermosetting compositions containing poly(arylacetylenes). 4,026,860, Cl. 260-30.60R.
Cessna, Lawrence C., Jr., to Hercules Incorporated. Thermosetting compositions containing poly(arylacetylenes). 4,026,861, Cl. 260-30.80R.
Chakrabarti, Jiban K.: *See—*
Cashin, Colin H.; Chakrabarti, Jiban K.; and Szinai, Stephen S., 4,027,035.
Chamberlain, Ralph Joseph, to American Cyanamid Company. Process for stabilizing lime mud. 4,026,991, Cl. 423-177.000.
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Bowditch, Philip N.; Toth, William E.; and Grossman, Arthur, 4,026,156.
Chateau, Louis, to Ducellier & Cie. Ignition distributor having contact adjustment mechanism. 4,027,120, Cl. 200-31.00A.

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Chem. Pure West, Inc.: *See*—
Robbins, Dean, 4,026,223.
Chemie Linz Aktiengesellschaft: *See*—
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Cheng, Wen-Jiu: *See*—
Christen, Jimmie Duane; and Cheng, Wen-Jiu, 4,026,986.
Chevron Research Company: *See*—
Simic, Milutin, 4,026,719.
Chimera R. & D., Inc.: *See*—
Druss, Barry L., 4,026,045.
Chinoin Gyogyszer-es Vegyeszeti Termekek Gyara RT: *See*—
Knoll, Jozsef; Furst, Zsuzsanna; Meszaros, Zoltan; Szentmiklosi, Peter; David, Agoston; Hermecz, Istvan; Mandi, Attila; Bognar, Rezso; Makleit, Sandor; Valovics, Gyula; Szavik, Laszlo; and Nagy, Sandor, 4,027,024.
Chiron, Bernard; and de Vecchis, Michel, to Societe Lignes Telegraphiques et Telephoniques. Non-reciprocal broadband slot line device. 4,027,253, Cl. 333-1.100.
Chisso Corporation: *See*—
Satoh, Akihiro; Konotsune, Shiro; Kachi, Atsuyuki; and Shimizu, Hiroshi, 4,027,087.
Chmura, William J., to Textron, Inc. Sintered spherical articles. 4,026,657, Cl. 403-122.000.
Chodnekar, Madhukar Subraya; Loeliger, Peter; Schwieter, Ulrich; Pfiffner, Albert; Suchy, Milos; and Zurfluh, Rene, to Hoffmann-La Roche Inc. Pesticides. 4,027,033, Cl. 424-282.000.
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Chrysler Corporation: *See*—
Fenn, Gordon William, 4,026,256.
Huebner, George J.; and Whitfield, James H., 4,026,455.
Chubbuck, John G., to Johns Hopkins University, The. Intracranial pressure monitor. 4,026,276, Cl. 128-2.00P.
Chugai Seiyaku Kabushiki Kaisha: *See*—
Hata, Shun-ichi; Mizuno, Koji; Nishii, Yasuho; Mitsuishi, Etsuko; and Shiba, Motoharu, 4,027,017.
Chvertko, Anatoly Ivanovich: *See*—
Shmakov, Eduard Ivanovich; Medovar, Boris Izrailevich; Chvertko, Anatoly Ivanovich; Koval, Vladimir Vasilievich; Fedotenkov, Vyacheslav Georgievich; Bondarenko, Oleg Petrovich; Kravchuk, Anatoly Iosifovich; Marchenko, Alexandr Mikhailovich; and Bogachenko, Alexei Georgievich, 4,027,233.
Ciaudelli, Joseph P., to Van Dyk & Company, Incorporated. Transparent ringing gels. 4,026,818, Cl. 252-316.000.
Ciba-Geigy AG: *See*—
Piller, Bernhard; Tschopp, Paul; Stauner, Thomas; and Heierli, Walter, 4,026,709.
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Andrews, Christopher Michael; and Dobinson, Bryan, 4,026,858.
Bateman, John H.; and Gordon, David A., 4,026,876.
Diethelm, Hermann; Ruf, Peter; and Zummerli, Willi, 4,026,864.
Frey, Christian; and Moser, Peter, 4,026,885.
Gagneux, Andre; Heckendorn, Roland; and Meier, Rene, 4,027,029.
Jaeggi, Knut A.; Ostermayer, Franz; and Schroter, Herbert, 4,027,027.
Nachbur, Hermann; and Maeder, Arthur, 4,026,889.
Rasberger, Michael; Rody, Johann; Moser, Paul; and Muller, Helmut, 4,026,866.
Wegmuller, Hans; and Haase, Jaroslav, 4,026,796.
Cincinnati Steel Treating Co.: *See*—
Dammel, Howard W.; Frantz, Robert M.; Luke, James H.; and Skrzypczyk, William G., 4,026,732.
CITC Industries, Inc.: *See*—
Senter, Jonas, 4,026,044.
Citizen Watch Co., Ltd.: *See*—
Ichikawa, Shingo; Kashima, Yoshinobu; and Takamune, Hirotoki, 4,026,103.
Kume, Kazunari; Watanabe, Minoru; Oono, Hideshi; and Tamaru, Munetaka, 4,026,100.
Citrin, Paul H.: *See*—
Chang, Chuan Chung; Citrin, Paul H.; and Schwartz, Bertram, 4,026,741.
Ciuti, Brunello; Angelini, Ferdinando; and Brandolese, Ernesto, to Snam Progetti S.p.A. Method for the preparation in a continuous way of water/oil emulsions and apparatus suitable therefor. 4,026,817, Cl. 252-312.000.
Clark, Ann V.; Cannavo, Frank A.; and Cannon, Donald L. Dancing slipper with self-molding toe insert. 4,026,046, Cl. 36-113.000.
Clark, Don A. Steel staple remover. 4,026,521, Cl. 254-28.000.
Clark, Don Richard: *See*—
Wells, Barry A.; and Clark, Don Richard, 4,026,988.
Clark, Elizabeth: *See*—
Harris, Henry H., 4,026,058.
Clark Equipment Company: *See*—
DePriester, Donald J., 4,026,378.
Clark, Harold A., to Dow Corning Corporation. Pigment-free coating compositions. 4,027,073, Cl. 428-412.000.
Clark, James Monroe, to International Telephone and Telegraph Corporation. Digital FSK demodulator. 4,027,266, Cl. 329-105.000.
Clatworthy, Edward Frederick: *See*—
Eiselstein, Herbert Louis; Clatworthy, Edward Frederick; and Smith, Darrell Franklin, Jr., 4,026,699.
Cleamax Limited: *See*—
Jackson, John Maxwell, 4,026,311.
Cleaveland, John A. Contact lens handling tools. 4,026,591, Cl. 294-1.0CA.
Clemett, Edwin F., Jr.: *See*—
Tinder, David V.; and Clemett, Edwin F., Jr., 4,026,468.
Clemmer, Clyde C.; and Alcorn, Ward C., III, to Dart Industries Inc. Apparatus for controlling operational parameters in polymerization equipment and related method. 4,027,085, Cl. 526-61.000.
Cleveland Machine Controls, Inc.: *See*—
Klimo, Robert G., 4,027,214.
Closmann, Philip J., to Shell Oil Company. Producing shale oil by flowing hot aqueous fluid along vertically varied paths within leached oil shale. 4,026,359, Cl. 166-263.000.
Coal Industry (Patents) Limited: *See*—
Jorro, Michael Anthony Ambrose; Rantell, Terry Dean; and Toswill, Diana Louise, 4,026,998.
Coaton, James Richard, to Thorn Electrical Industries Limited. Tungsten halogen lamp. 4,027,189, Cl. 313-222.000.
Cocks, Eric H. Precision fluid dispensing and mixing system. 4,026,439, Cl. 222-49.000.
Coe, Jack; and Price, Graham Frederick, to USM Corporation. Nailing machines. 4,026,454, Cl. 227-151.000.
Coffen, David Llewellyn, to Hoffmann-La Roche Inc. Conversion of 4-lower alkyloxazole-5-carboxamide to 4-lower alkyl-5-cyanooxazoles. 4,026,901, Cl. 260-307.00R.
Cohen, Morrel H.; Miles, Malcolm G.; and Wilson, James D., to Monsanto Company. Electrically conducting organic salts. 4,026,905, Cl. 260-327.00M.
Cohn, Arnold S.; Rohde, Heinz K.; and Koehler, Albert M., to Brown & Root, Inc. Method and apparatus for connecting and disconnecting a supportive buoyant structure to and from an offshore tower jacket. 4,026,227, Cl. 114-264.000.
Coleman, Rich F. Solar energy apparatus. 4,026,267, Cl. 126-270.000.
Coleman, William E., to NCR Corporation. Variable bar display tube using insulated electrodes. 4,027,197, Cl. 315-169.0TV.
Colgate-Palmolive Company: *See*—
Messina, Ralph P., 4,027,007.
Colle, Augusto; and Fisher, James, to American Standard, Inc. Boiler for central heating installations and heat exchange elements for said boiler. 4,026,246, Cl. 122-225.00R.
Collin, Per Harald, to Stora Kopparbergs Bergslags Aktiebolag. Apparatus for and process of converting carbonaceous materials containing sulphur to an essentially sulphur-free combustible gas. 4,026,679, Cl. 48-73.000.
Collings, Robert F.: *See*—
Fowler, Hugh; Ruben, Murray A.; Dumais, Richard L.; and Collings, Robert F., 4,027,140.
Collins, James R., to General Electric Company. Photocoupled isolated switching amplifier circuit. 4,027,228, Cl. 323-21.000.
Collins, John J., to Union Carbide Corporation. Air separation by adsorption. 4,026,680, Cl. 55-26.000.
Collins, Robert Henry; Levine, Richard F.; North, William D.; O'Rourke, Gerald D.; and Parker, Gerald R., to International Business Machines Corporation. Reliable MOSFET device and method for making same. 4,027,321, Cl. 357-23.000.
Collins, Thomas W.: *See*—
Schweitzer, Paul H.; Volz, Carl; and Collins, Thomas W., 4,026,251.
Combustion Engineering, Inc.: *See*—
Barger, John Joseph, 4,027,135.
Commonwealth Oil Refining Co., Inc.: *See*—
McDonald, Gerald W. G., 4,026,674.
Compagnie Generale des Etablissements Michelin, raison sociale Michelin & Cie: *See*—
Lejeune, Daniel, 4,026,318.
Compagnie Honeywell Bull (Societe Anonyme): *See*—
de Poncins, Gerard, 4,026,405.
Compagnie Industrielle des Telecommunications Cit-Alcatel: *See*—
de Loye, Martin; and Beduchaud, Michel, 4,027,337.
Conan, Michel: *See*—
Bouy, Pierre; de Lachaux, Hubert; and Conan, Michel, 4,026,782.
Conley, Challie, to Hallamore Inc. Exhaust system cover assembly. 4,026,381, Cl. 181-62.000.
Connally, Carl A., to Ozark-Mahoning Company. Processes of concentrating solutions by multistage spraying. 4,026,760, Cl. 159-48.00L.
Conroy, Alan P.: *See*—
Albert, Frank D.; Conroy, Alan P.; and Skinner, David L., 4,026,478.
Consortium fur Elektrochemische Industrie GmbH: *See*—
Dressnandt, Gunter; Meyer, Hermann; Keil, Walter; Sommer, Oswin; Marquardt, Klaus; Kreuzer, Franz Heinrich; and Louis, Eckhart, 4,026,853.
Container Corporation of America: *See*—
Johnson, Fred J., 4,026,411.
Continental Bank & Trust Co., The, administrator: *See*—
McCay, Frank Vernon, Jr., deceased, 4,026,118.
Continental Group, Inc., The: *See*—
Gailus, Walter J.; Lam, Robert; and Patel, Jayadev P., 4,026,207.
Control Data Corporation: *See*—
Lincoln, Neil R.; and Resnick, David R., 4,027,293.

Cook, Glenn M.: *See—*
Ammann, Paul R.; Cook, Glenn M.; and Portal, Charles, 4,026,772.

Cooper, Michael John: *See—*
Preston, John; and Cooper, Michael John, 4,027,023.

Cordes, Claus; Strickle, Erich; Zendath, Josef; and Simon, Georg Nikolaus, to BASF Aktiengesellschaft. Manufacture of polyamide foams. 4,026,834, Cl. 260-2.50N.

Cornille, Georges; Jacobs, Roland; and Bontinck, Walter, to U.C.B, Societe Anonyme. Films from modified regenerated cellulose. 4,026,718, Cl. 106-168.000.

Corning Glass Works: *See—*
Bartholomew, Roger F., 4,026,692.
Gossie, Mijo A., 4,026,755.

Costa, Roger; and French, Lawrence T., Jr., to Insulin Injector Inc. Syringe injecting device. 4,026,288, Cl. 128-218.00F.

Costantini, Michel; Dromard, Adrien; and Jouffret, Michel, to Rhone-Poulenc Industries. Process for the oxidation of β-isophorone. 4,026,947, Cl. 260-586.00P.

Costen, Robert C., to United States of America, National Aeronautics and Space Administration. Vortex generator for controlling the dispersion of effluents in a flowing liquid. 4,026,527, Cl. 259-4.00R.

Coultas, George E.: *See—*
Kahoe, H. Taylor; Coultas, George E.; and Skipworth, Dana W., 4,026,321.

Coulter Information Systems, Inc.: *See—*
Kuehnle, Manfred R., 4,026,787.

Coutta, John M. Surveillance system. 4,027,329, Cl. 358-108.000.

Covert, Douglas C.: *See—*
Valentine, Charles G.; and Covert, Douglas C., 4,026,040.

Cox, Michael A. Protective hull safety cover. 4,026,233, Cl. 114-229.000.

Crawford, Harry J. Tape dispenser and applicator. 4,026,757, Cl. 156-575.000.

Creissels, Denis C. Inclined lift. 4,026,388, Cl. 187-14.000.

Cremer, Helmut: *See—*
Knoche, Karl-Friedrich; Cremer, Helmut; and Steinborn, Gerhard, 4,026,999.

Cremer, Robert L., to Neosho Products Company. Portable barbecue. 4,026,266, Cl. 126-25.00A.

Crespolini, Giancarlo: *See—*
Vargiu, Silvio; Crespolini, Giancarlo; and Grazzini, Giulio, 4,026,761.

Crick, Aubrey M., to International Standard Electric Corporation. Optical fiber connector. 4,026,633, Cl. 350-96.00C.

Crick, Aubrey M.: *See—*
Phillips, Michael J.; and Crick, Aubrey M., 4,026,972.

Crippa, Egidia. Container provided with an outer testpiece for the analysis of urine and other acid liquids. 4,026,433, Cl. 215-6.000.

Criscimagna, Tony N.; and Steinmetz, Michael J., to International Business Machines Corporation. Bilateral selective burst erase system. 4,027,196, Cl. 315-169.0TV.

Crist, Buckley, to Jaclo, Inc. Shower flow modulator. 4,026,470, Cl. 239-102.000.

Crivello, James V.; and Schroeter, Siegfried H., to General Electric Company. Photocurable compositions and methods. 4,026,705, Cl. 96-27.00R.

Crofoot, Percy. Vent frames. 4,026,082, Cl. 52-302.000.

Cronin, John J., to U. S. Divers Co. Angular foot fin. 4,025,977, Cl. 9-309.000.

Crosby, David Rogers. Glass balloons and method for making same. 4,026,499, Cl. 244-31.000.

Cross, Barrington, to American Cyanamid Company. Method for utilizing benzophenone ureas. 4,026,697, Cl. 71-120.000.

Cross, Edward A.; and Downer, John D., to Texaco Inc. Stabilized dispersions of micronutrients in spray oils. 4,026,694, Cl. 71-11.000.

Cross, Homer C.; and Jerman, Daniel L., to Parsons, Brinckerhoff, Quade & Douglas, Inc. Self steering railway axles and wheels on track curvatures. 4,026,217, Cl. 105-224.100.

Cross, Leslie E.; Kunz, Raymond J.; and Newnham, Robert E., to Leco Corporation. Process for producing ferroelectric crystalline material. 4,027,074, Cl. 428-450.000.

Crouse-Hinds Company: *See—*
Barthel, Frank S., 4,027,151.

Crowdy, Edmund Porter, to Hawthorn Leslie (Engineers) Limited. Heat exchangers. 4,026,353, Cl. 165-135.000.

Crown Cork & Seal Company, Inc.: *See—*
Leenaards, Antoine Joseph, 4,026,422.

Crown Zellerbach Corporation: *See—*
Hartbauer, Ellsworth A.; and Weis, Rudolf R., 4,026,752.

Crum, Gerald W.; Nord, Eric T.; Reighard, Alan B.; and Tamny, Simon Z., to Nordson Corporation. Adhesive gun. 4,026,440, Cl. 222-146.00R.

Crystal, Richard G., to Xerox Corporation. Electrostatographic development. 4,027,048, Cl. 427-14.000.

CSELT - Centro Studi e Laboratori Telecomunicazioni SpA: *See—*
Belforte, Piero; Guaschino, Giancarlo; and Perucca, Giovanni, 4,027,106.

Cucalon, Ricardo E., to Raymond Lee Organization, Inc., The, a part interest. Detachable battery clamp. 4,026,626, Cl. 339-226.000.

Cue Products, Inc.: *See—*
Hartung, Donald H., 4,025,962.

Culhane, Gerald J.; Layton, Gary R.; and Pittman, Walter E., to Eastman Kodak Company. Control apparatus for silver halide emulsion making. 4,026,668, Cl. 23-253.00A.

Culver, Irven H., to Secundus, Inc. Apparatus for improving the accuracy of a friction wheel distance measuring device. 4,026,029, Cl. 33-125.00M.

Cuniberti, Mario, to Owens-Illinois, Inc. Motion translating apparatus and controls therefor. 4,026,420, Cl. 214-1.0BT.

Curl, Rane L.: *See—*
Dorrance, William H.; and Curl, Rane L., 4,027,003.

Curnan, William A.: *See—*
DeLille, Richard A.; Curnan, William A.; and DeGryse, Gentiel M., 4,027,144.

Currin, Cedric G.: *See—*
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Cutler-Hammer, Inc.: *See—*
Dummer, Merlin R., 4,027,127.
Haderer, Edward G.; Sawoski, Edward J.; and Shanebrook, Robert E., 4,027,121.

Czysch, Werner; Muller, Walter; and Goller, Heinz, to Chemie Linz Aktiengesellschaft. Production of low-fluorine gypsum as a by-product in a phosphoric acid process. 4,026,990, Cl. 423-167.000.

Dagnaux, Michele: *See—*
Poittevin, Andre; Fournex, Robert; and Dagnaux, Michele, 4,027,030.

Dahlen, Gunnar John, to Trailer Finans AB. Sanitary closet. 4,025,969, Cl. 4-142.000.

Daicel, Ltd.: *See—*
Ikeda, Tadayoshi, 4,026,720.

Daimler-Benz Aktiengesellschaft: *See—*
Wulf, Helmut; Schiesterl, Gerhard; and Scholz, Hansjurgen, 4,026,580.

Dais, William F.; and Malarz, Antoni J., to General Motors Corporation. Grinding wheel tubular support for radial expansion thereof. 4,026,074, Cl. 51-168.000.

D'Alelio, Gaetano F., to University of Notre Dame. Aromatic epoxy-terminated polyimides. 4,026,904, Cl. 260-326.00C.

D'Alelio, Gaetano Francis, to University of Notre Dame. Chain-extending polyimides with aromatic polyisocyanates. 4,026,833, Cl. 260-25.00R.

D'Alelio, Gaetano Francis, to University of Notre Dame. Chain-extending phenolic end-capped polyimides. 4,026,871, Cl. 260-49.000.

Dammel, Howard W.; Frantz, Robert M.; Luke, James H.; and Skrzypczyk, William G., to Cincinnati Steel Treating Co.; and General Electric Company. Method for induction hardening gear teeth. 4,026,732, Cl. 148-154.000.

Damokos, Tamas: *See—*
Berky, Denes; Damokos, Tamas; Havas, Jeno; and Muller, Henrik, 4,026,774.

Dansk Svejsemaskine Farrik A/S: *See—*
Werdelin, Hans Kristian; Hansen, Knud Verner; and Andersen, Jens Holst, 4,026,332.

Dardaine, Edgar; Berry, Jean-Luc; Siard, Michel; and Pellerin, Daniel, to E.P. Remy et Cie. Method of automatic manufacture of closed, internally sterile hollow bodies. 4,026,982, Cl. 264-89.000.

Dardick, David. Open chamber gas powered tool and gas generating charge therefor. 4,026,212, Cl. 102-39.000.

Dart Industries Inc.: *See—*
Clemmer, Clyde C.; and Alcorn, Ward C., III, 4,027,085.

Data Terminal Systems, Inc.: *See—*
Fowler, Hugh; Ruben, Murray A.; Dumais, Richard L.; and Collings, Robert F., 4,027,140.

Daum, Werner; Behrenz, Wolfgang; Hammann, Ingeborg; Scheinpflug, Hans; and Brandes, Wilhelm, to Bayer Aktiengesellschaft. 1-Triorgano-stannyl-3-substituted-2,4-dioxo-1,2,3,4-tetrahydro-s-triazino-[1,2-a]-benzimidazoles. 4,026,934, Cl. 424-245.000.

David, Agoston: *See—*
Knoll, Jozsef; Furst, Zsuzsanna; Meszaros, Zoltan; Szentmiklosi, Peter; David, Agoston; Hermecz, Istvan; Mandi, Attila; Bognar, Rezso; Makleit, Sandor; Valovics, Gyula; Szavik, Laszlo; and Nagy, Sandor, 4,027,024.

Davis, Deane N., to Raymond Lee Organization, Inc., The, a part interest. Water and energy saving closet tank flush valves. 4,025,968, Cl. 4-67.00A.

Davis, Walter R.: *See—*
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Davis, William F., to Motorola, Inc. Clamping circuit. 4,027,177, Cl. 307-237.000.

Davison, Martin; and Gathwright, Clement G., to Western Coat Pad Company. Variable work station for pneumatic stapling apparatus. 4,026,453, Cl. 227-109.000.

Dawson, Robert Herman: *See—*
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Dawson, Samuel G.: *See—*
Fowler, Charles F.; and Dawson, Samuel G., 4,026,751.

Dawson, William; Foulis, Michael John; Gutteridge, Norman James Albert; and Smith, Colin William, to Lilly Industries, Ltd. 3-Substituted propanoic acid derivatives and pharmaceutical composition. 4,027,036, Cl. 424-305.000.

De La Cruz, Gloven G.: *See—*
Grof, Tibor T.; and De La Cruz, Gloven G., 4,026,723.

Dean, David W., to NBC Entertainment Corporation. Safety light. 4,027,150, Cl. 240-7.550.

DeBaun, Jack R.; Pallos, Ferenc M.; and Baker, Don R., to Stauffer Chemical Company. 2-Cyclopropanecarboxamido-5-halothiazole as anti-inflammatory agents. 4,027,031, Cl. 424-270.000.

Dechelette, Helen; and Joly, Jean Claud, to AMP Incorporated. Method of manufacturing an electrical harness and electrical con-

nectors and terminals for carrying out the method. 4,026,629, Cl. 339-97.00P.

Deck, Charles Francis: *See—*
Login, Robert Bernard; Deck, Charles Francis; and Thir, Basil, 4,026,941.

Declercq, Maurice G. Self-tailing winch. 4,026,525, Cl. 254-150.00R.

DeFevere, Dennis C.; and Solomon, Raymond, to Hewlett-Packard Company. Liquid phase epitaxial reactor apparatus. 4,026,240, Cl. 118-415.000.

De Freitas, Richard E.; Mitchell, Peter W.; Tribeman, Peter D.; and Wilensky, Samuel, to Hybrid Systems Corporation. Simulation of reverberation in audio signals. 4,027,101, Cl. 179-1.0GQ.

DeGryse, Gentiel M.: *See—*
DeLille, Richard A.; Curnan, William A.; and DeGryse, Gentiel M., 4,027,144.

Deinlein-Kalb, Hans, to AEG-Kanis Turbinenfabrik GmbH. Rapid opening valve for steam-operated power devices. 4,026,327, Cl. 137-630.000.

de Lachaux, Hubert: *See—*
Bouy, Pierre; de Lachaux, Hubert; and Conan, Michel, 4,026,782.

Delaney, Leo L.; and Barker, Harold, to Aluflex Partitions (Eastern 1970) Ltd. Suspended ceiling panel. 4,026,081, Cl. 52-222.000.

Delavarenne, Serge-Yvon: *See—*
Pralus, Michele; Schirmann, Jean-Pierre; and Delavarenne, Serge-Yvon, 4,026,908.

Delgrosso, Eugene J.: *See—*
Galasso, Francis S.; Kuntz, Urban E.; and Delgrosso, Eugene J., 4,026,677.

DeLille, Richard A.; Curnan, William A.; and DeGryse, Gentiel M., to Gulf & Western Industries, Inc. Magnetic return mechanism. 4,027,144, Cl. 235-144.0ME.

DeLorean, John Z.; and Dirks, Chauncey L., to John Z. DeLorean Corporation. Composite tubing. 4,026,747, Cl. 156-171.000.

de Loye, Martin; and Beduchaud, Michel, to Compagnie Industrielle des Telecommunications Cit-Alcatel. Installation for the remote transmission of facsimiles. 4,027,337, Cl. 360-73.000.

DeLuca, Carlo J.; and Gilmore, L. Donald, to Liberty Mutual. Method and apparatus for interfacing to nerves. 4,026,300, Cl. 128-418.000.

Demag Aktiengesellschaft: *See—*
Messerschmidt, Dieter; Kluge, Johannes; and Schleyer, Meinolf, 4,026,526.

De Maria, Carmine. Convertible sofa bed. 4,025,971, Cl. 5-18.00R.

Denisov, Vladislav Mikhailovich: *See—*
Kaluzhsky, Nikolai Andreevich; Rubinchik, Faitel Markovich; Nasyrov, Gakif Zakirovich; Kaim, German Abramovich; Averin, Vitaly Mikhailovich; Milrud, Savely Mikhailovich; Telyatnikov, Garry Vladimirovich; Lyakhov, Viktor Prokhorovich; Abramova, Ljudmila Nikolaevna; Tarasov, Vladimir Ivanovich; Denisov, Vladislav Mikhailovich; Nasyrov, Dinam Latypovich; Stolyar, Boris Alexandrovich; Tagiev, Muzafar Suleiman-ogly; Lagno, Vladimir Ivanovich; and Kostin, Vladimir Nikolaevich, 4,026,672.

Denzel, Theodor; and Hoehn, Hans, to E. R. Squibb & Sons, Inc. Pyrazolo[1,5-a]pyrido[3,2-e]pyrimidine-7-carboxylic acid derivatives. 4,026,893, Cl. 260-256.40F.

Denzinger, Walter: *See—*
Herrle, Karl; Denzinger, Walter; Seelert, Kurt; and Schwarz, Wolfgang, 4,027,083.

Department of Mechanical Engineering Louisiana Tech University: *See—*
Barnwell, J. H.; and Wilkinson, M. T., 4,026,534.

de Poncins, Gerard, to Compagnie Honeywell Bull (Societe Anonyme). Process and apparatus for determining the magnitude of the paper advance commanded in a printing machine. 4,026,405, Cl. 197-133.00R.

DePriester, Donald J., to Clark Equipment Company. Electric lift truck body construction. 4,026,378, Cl. 180-68.500.

Deraedt, Roger; Marchandeau, Christian; and Meier, Jean, to Roussel-UCLAF. Novel benzophenone derivatives. 4,027,040, Cl. 424-331.000.

Derval, Victor E.: *See—*
Wells, Richard E.; Derval, Victor E.; and Muchow, John D., 4,026,326.

Detector Electronics Corporation: *See—*
Larsen, Theodore E.; and Kintigh, Stanley S., 4,027,164.

de Valroger, Pierre Albert Marie. Electronic switching arrangement for energizing electric motors. 4,027,213, Cl. 318-138.000.

de Vecchis, Michel: *See—*
Chiron, Bernard; and de Vecchis, Michel, 4,027,253.

de Vries, Gerhard Heinrich Friedrich; van Esdonk, Johannes; and Goos, Theunis, to U.S. Philips Corporation. Gas discharge display device having plural groups of cathodes. 4,027,186, Cl. 313-217.000.

Diakantonis, Tony; and Sweatt, Warren L. Alarm and safety capsule. 4,027,304, Cl. 340-304.000.

Diamond International Corporation: *See—*
Siciliano, Anthony J., 4,026,622.

Diamond Shamrock Corporation: *See—*
Kennedy, Alexander W., 4,026,710.

Diana, Guy D., to Sterling Drug Inc. 1-Phenyl-3-azacarbocyclic-ureas. 4,026,938, Cl. 260-295.00E.

Dick, Walter. Polyhedral elements with undercut recesses and cylindrical connectors having collars. 4,026,065, Cl. 46-25.000.

Dickerson, James Hinton, Jr.: *See—*
Lovett, Joe Bryant; and Dickerson, James Hinton, Jr., 4,026,691.

Didier Engineering GmbH: *See—*
Steimann, Franz, 4,026,769.

Dieck, Ronald L.; and Quinn, Edwin J., to Armstrong Cork Company. Smoke-suppressant additives for polyphosphazenes. 4,026,838, Cl. 260-2.5FP.

Dieck, Ronald L.; and Quinn, Edwin J., to Armstrong Cork Company. Polyphosphazene polymer/silicone rubber blends and foams therefrom. 4,026,839, Cl. 260-2.5FP.

Diederen, Willi: *See—*
Austel, Volkhard; Kutter, Eberhard; Heider, Joachim; Eberlein, Wolfgang; Kadatz, Rudolf; and Diederen, Willi, 4,026,891.

Diener, Erhard Armin. Destructible bore forming means. 4,026,511, Cl. 249-62.000.

Diethelm, Hermann; Ruf, Peter; and Zummerli, Willi, to Ciba-Geigy Corporation. Process for the manufacture of aminoplast and phenoplast moulding compositions using a fluidized bed drier. 4,026,864, Cl. 260-38.000.

Dill, John L., III; and Kennedy, Othar P., Jr., to National Seating Company. Air suspension seat assembly. 4,026,601, Cl. 297-345.000.

Diotallevi, Gianfranco: *See—*
Lo Valvo, Ernesto; Diotallevi, Gianfranco; and Lagana, Carlo, 4,027,086.

Dirks, Chauncey L.: *See—*
DeLorean, John Z.; and Dirks, Chauncey L., 4,026,747.

Dirks, Gerhard, to Hale Bros. Associates. Storage-controlled output device. 4,027,287, Cl. 340-172.500.

Ditter, Jerome F.; and Klusmann, Eugene B., to United States of America, Navy. Synthesis of decaborane-14 and alkyl-substituted decaborane-14. 4,026,993, Cl. 423-294.000.

Dixon, Samuel, to United States of America, Army. Low level broadband limiter having ferrite rod extending through dielectric resonators. 4,027,256, Cl. 333-17.00L.

Doane, Ivan G., to Moore Business Forms, Inc. Circuitry for generating a plurality of independent ink print control signals. 4,026,401, Cl. 197-1.00R.

Doane, William M.: *See—*
Bagley, Edward B.; Fanta, George F.; Doane, William M.; Gugliemelli, Lewis A.; and Russell, Charles R., 4,026,849.

Dobinson, Bryan: *See—*
Andrews, Christopher Michael; and Dobinson, Bryan, 4,026,858.

Dobromirski, Walerian: *See—*
Zbilut, Wojciech; Dobromirski, Walerian; and Wojtasik, Jerzy, 4,026,234.

Dobson, Robert D.: *See—*
Hutchins, James P.; and Dobson, Robert D., 4,026,292.

Dr. C. Otto & Comp. G.m.b.H.: *See—*
Bahnsch, Hans; and Kwasnik, Hans-Jurgen, 4,026,768.

Doherty, John, Jr., to Texas Instruments Incorporated. Dual function thermal valve. 4,026,464, Cl. 236-48.00R.

Dolfini, Joseph Edward; and Bohme, Ekkehard, to E. R. Squibb & Sons, Inc. 7-Acyl-7-arylthiocephalosporins. 4,026,886, Cl. 260-243.00C.

Domig, Rene; and Weidmann, Erich, to Aktiengesellschaft Gebruder Loepfe. Device for monitoring the travel of a yarn like structure utilizing the frictional electricity involved with said travel. 4,027,232, Cl. 324-32.000.

Dominguez, Julio: *See—*
Mosley, Thomas P.; and Dominguez, Julio, 4,026,062.

Dorda, Gerhard: *See—*
Jacobs, Erwin; and Dorda, Gerhard, 4,027,320.

Doring, Fritz: *See—*
Beck, Gunther; Doring, Fritz; and Holtschmidt, Hans, 4,026,892.

Dorrance, William H.; and Curl, Rane L., to Organization Control Services, Inc. Thermochemical production of hydrogen and oxygen from water. 4,027,003, Cl. 423-579.000.

Dotti, Giuseppe, to Snamprogetti, S.p.A. Device for conveying a fluid between a subsea duct and a buoy. 4,026,119, Cl. 61-95.000.

Doublefell Limited: *See—*
Polkinghorne, Alan; and Wood, Raymond Frank, 4,027,218.

Doughty, James M. Plant fender or guard for cultivators. 4,026,366, Cl. 172-511.000.

Douglas Dynamics Corporation: *See—*
Hill, Jack C.; and Bennett, David E., 4,026,048.

Dow Chemical Company, The: *See—*
Christen, Jimmie Duane; and Cheng, Wen-Jiu, 4,026,986.
Gross, James Richard; Potter, James Larry; and Kassell, Frederick Bernhard, 4,026,932.
Gulbenk, Alin H., 4,026,937.
Lovett, Joe Bryant; and Dickerson, James Hinton, Jr., 4,026,691.
Matthews, W. Thomas, 4,026,111.
May, James A., 4,026,460.

Dow Corning Corporation: *See—*
Bartos, Donald M.; and Currin, Cedric G., 4,026,268.
Clark, Harold A., 4,027,073.
Kim, Yung K.; Lee, Chi-Long; and Ronk, Gary M., 4,026,845.
Kittle, Ronald E., 4,026,843.
Kittle, Ronald E.; and Ronk, Gary M., 4,026,844.
Kittle, Ronald E.; and Polmanteer, Keith E., 4,026,846.
Lee, Chi-Long; and Ronk, Gary M., 4,026,835.
Lee, Chi-Long; and Ronk, Gary M., 4,026,842.

Downer, John D.: *See—*
Cross, Edward A.; and Downer, John D., 4,026,694.

Dranselka, Marvin A. Post pulling apparatus. 4,026,522, Cl. 254-30.000.

Drees, Joseph M.; and Beyerlein, Fritz W., to Signetics Corporation.

Semiconductor lead structure and assembly and method for fabricating same. 4,026,008, Cl. 29-574.000.

Dremann, George H. Self-cleaning muffler for an abrasive blast system. 4,026,072, Cl. 181-36.00A.

Dressel, Waldemar M.: *See—*
Fukubayashi, Haruhisa; and Dressel, Waldemar M., 4,026,786.

Dressnandt, Gunter; Meyer, Hermann; Keil, Walter; Sommer, Oswin; Marquardt, Klaus; Kreuzer, Franz Heinrich; and Louis, Eckhart, to Consortium fur Elektrochemische Industrie GmbH. Curable bituminous organopolysiloxane compositions. 4,026,853, Cl. 260-28.5AS.

Driffield, John B.; Kerr, Howard S.; Penrose, Richard M.; and Stonell, Anthony C., to United States of America, Army. Infrared detection system with parallel strip reticle means. 4,027,160, Cl. 250-339.000.

Drinkard, Gary, to Shell Oil Company. Hydrothermally forming a flow barrier in a leached subterranean oil shale formation. 4,026,360, Cl. 166-272.000.

Dromard, Adrien: *See—*
Costantini, Michel; Dromard, Adrien; and Jouffret, Michel, 4,026,947.

Drori, Mordeki. Filter including fluid-flow control. 4,026,806, Cl. 210-405.000.

Drury, Emma-Jane E., to Eastman Kodak Company. Microorganism inhibitors. 4,026,712, Cl. 106-15.00R.

Druschel, William Otto: *See—*
Caccoma, George Anthony; Castrucci, Paul Philip; and Druschel, William Otto, 4,027,246.

Druss, Barry L., to Chimera R. & D., Inc. Boot sole structures. 4,026,045, Cl. 36-108.000.

Du Pont of Canada Limited: *See—*
King, David Campbell; and Kendall, John Anthony, 4,026,324.

Dubbe, Richard F.; and Ebbinga, Richard D., to Minnesota Mining and Manufacturing Company. Apparatus for encoding a magnetic label. 4,027,141, Cl. 235-61.70R.

Ducellier & Cie.: *See—*
Chateau, Louis, 4,027,120.

Duchemin, Michel, to Ressorts du Nord S.A. System for fastening a rail to its support. 4,026,466, Cl. 238-349.000.

Duffner, Morris V.; and Mintz, Alexander, to Grumman Aerospace Corporation. Electrical connector for cables and magnetic forming process for same. 4,026,628, Cl. 339-177.00E.

Duffy, James J., to Hooker Chemicals & Plastics Corporation. Flame retardant textile finishes. 4,026,808, Cl. 252-8.100.

Dugdale, Lee A.: *See—*
Schoofs, Richard J.; Nordhausen, Lloyd J.; and Dugdale, Lee A., 4,026,821.

Dugger, Elizabeth L.; and Kessler, Alan B., to Lever Brothers Company. Laundry additive dispenser. 4,026,131, Cl. 68-17.00A.

Dumais, Richard L.: *See—*
Fowler, Hugh; Ruben, Murray A.; Dumais, Richard L.; and Collings, Robert F., 4,027,140.

Dummer, Merlin R., to Cutler-Hammer, Inc. Electric switches having selectable and adjustable pre-travels. 4,027,127, Cl. 200-153.0LA.

Dunlop Limited: *See—*
Foster, Brian; and Mortimer, Frank Radcliffe, 4,026,579.

Dunn Instruments, Inc.: *See—*
Barney, Howard Hunter, 4,027,315.

Dunn, Kenneth Michael. Device for feeding gas into underground cavities to asphyxiate rodents. 4,026,330, Cl. 138-103.000.

Dunn, Robert C.; and Jania, Joseph M., to International Harvester Company. Multi-positional seat having a following instrument panel. 4,026,379, Cl. 180-77.00S.

Dunnigan, Daniel Ambrose: *See—*
Winn, Martin; Kyncl, Jaroslav; Dunnigan, Daniel Ambrose; and Jones, Peter Hadley, 4,026,894.

Du Pont de Nemours, E. I., and Company: *See—*
Bosley, David Emerson, 4,026,098.
Flexman, Edmund Arthur, Jr.; and Starr, Frank Clyde, Jr., 4,026,967.
Gajjar, Bharat Jaybhadra, 4,026,130.
Greene, Robin Nikolas, 4,026,851.
Grot, Walther Gustav, 4,026,783.
Hertler, Walter Raymond, 4,026,916.
Hess, Richard William, 4,026,722.
Sleight, Arthur William, 4,027,004.
Victorius, Claus, 4,027,066.

Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, to Smith Kline & French Laboratories Limited. Pharmaceutical compositions and methods of inhibiting H-2 histamine receptors with pyridyl substituted thioalkyl- and oxyalkyl-thioureas and ureas. 4,027,026, Cl. 424-263.000.

Duratainer Inc.: *See—*
Ward, George G., 4,026,801.

Durholz, Friedrich: *See—*
Bohm, Walter; Blank, Heinz Ulrich; Skipka, Guido; and Durholz, Friedrich, 4,026,944.

Durum, Metin Mustafa, to Borg-Warner Corporation. Universal joint. 4,026,123, Cl. 64-21.000.

Dutton, Walter A.: *See—*
Bradburn, Ronald G.; Flintoff, Brian C.; Walker, Robert A.; and Dutton, Walter A., 4,026,479.

Dyer, David F.; and Maples, Glennon. Dryer with low temperature heat recovery system. 4,026,035, Cl. 34-23.000.

Dygve, Hans G E; and Risman, Per Olov G, to Husqvarna AB. Microwave radiators. 4,027,133, Cl. 219-10.55F.

Dynamit Nobel Aktiengesellschaft: *See—*
Steffen, Klaus-Dieter, 4,026,827.

E.P. Remy et Cie: *See—*
Dardaine, Edgar; Berry, Jean-Luc; Siard, Michel; and Pellerin, Daniel, 4,026,982.

E. R. Squibb & Sons, Inc.: *See—*
Denzel, Theodor; and Hoehn, Hans, 4,026,893.
Dolfini, Joseph Edward; and Bohme, Ekkehard, 4,026,886.

Early, Judson Horace: *See—*
Off, Joseph W. A.; and Early, Judson Horace, 4,026,172.

Eastman Kodak Company: *See—*
Culhane, Gerald J.; Layton, Gary R.; and Pittman, Walter E., 4,026,668.
Drury, Emma-Jane E., 4,026,712.
Mee, John David, 4,026,884.
Phillips, Bobby M., 4,025,994.
Phillips, Bobby M., 4,026,099.

Ebbinga, Richard D.: *See—*
Dubbe, Richard F.; and Ebbinga, Richard D., 4,027,141.

Eberlein, Wolfgang: *See—*
Austel, Volkhard; Kutter, Eberhard; Heider, Joachim; Eberlein, Wolfgang; Kadatz, Rudolf; and Diederen, Willi, 4,026,891.

Eckels, Calvin W., Jr.: *See—*
Wu, Joseph C.; Walsworth, Clyde R.; and Eckels, Calvin W., Jr., 4,027,332.

Edwards, Douglas Cameron; and Fischer, Erhardt, to Polysar Limited. Particulate oil-black masterbatch. 4,026,933, Cl. 260-33.6AQ.

Eggers, Edward T.: *See—*
Blanshine, Allison W.; Eggers, Edward T.; and Hyman, Myles, 4,026,205.

Eggett, Janet M.: *See—*
Giddings, Brandford E.; and Eggett, Janet M., 4,027,090.

Egtvedt, Myron D.: *See—*
Ziemba, Richard T.; and Egtvedt, Myron D., 4,026,215.

Ehrlich, Josef, to Outboard Marine Corporation. Two stroke internal combustion engine and method of operation thereof. 4,026,254, Cl. 123-73.0AA.

Eilers, Carl G., to Zenith Radio Corporation. Multiple channel FM stereo system. 4,027,107, Cl. 179-15.0BT.

Eisai Co., Ltd.: *See—*
Tanaka, Satoru; and Watanabe, Hideaki, 4,026,895.

Eiselstein, Herbert Louis; Clatworthy, Edward Frederick; and Smith, Darrell Franklin, Jr., to Huntington Alloys, Inc. Matrix-stiffened heat and corrosion resistant alloy. 4,026,699, Cl. 75-134.00F.

Ekstrom, Lars. Waterseal. 4,026,317, Cl. 137-216.100.

Electric Furnace Company, The: *See—*
Perrine, Ralph J., 4,026,731.

Eli Lilly and Company: *See—*
Cashin, Colin H.; Chakrabarti, Jiban K.; and Szinai, Stephen S., 4,027,035.
Stephan, Erwin A., 4,027,041.

Ellinger, Bernd, to Hermann Kronseder Maschinenfabrik. Apparatus for testing tops of containers for damage. 4,026,414, Cl. 209-111.70R.

Elmer, Otto C., to General Tire & Rubber Company, The. Glass cord adhesives comprising vinyl pyridine terpolymer/lignin sulfonate-resorcinol-formaldehyde reaction product; method of use and composite article. 4,026,744, Cl. 156-110.00A.

Elslager, Edward Faith, to Parke, Davis & Company. Benzo and benzothiopyranoindazole N-oxides. 4,026,899, Cl. 260-293.570.

Eltra Corporation: *See—*
Klepper, Herbert; Hansen, Walter; Harris, Joel S.; and Golesorkhi, Farrokh, 4,027,313.

Elvin, Sten, to Asea Aktiebolag. DC convertor. 4,027,225, Cl. 321-10.000.

Ely, Richard E., to United States of America, Army. Rapid shutter mechanism. 4,027,168, Cl. 250-514.000.

Emhart Industries, Inc.: *See—*
Flanagan, Thomas L., 4,026,237.

Emmerich, Kenneth C., to Fansteel Inc. Mining tool. 4,026,605, Cl. 299-92.000.

Emmett, John Colin: *See—*
Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, 4,027,026.

Engel, Christopher M., to Zenith Radio Corporation. Combination voltage regulating system. 4,027,227, Cl. 323-8.000.

Engelbrecht, John W.; and Lockard, John C., to Kellwood Company. Composition and method for imparting fire resistance and water repellency to fabric. 4,027,062, Cl. 428-262.000.

Engins Matra: *See—*
Beaurain, Pierre, 4,026,654.

Engstrom, Bengt Lars Olof, to Saab-Scania Aktiebolag. Device for temperature compensation in a pressure medium circuit. 4,026,110, Cl. 60-592.000.

Environmental Elements Corporation: *See—*
Snader, Earle Stuart; and McKewen, John Leo, 4,026,683.

Eppler, Daniel, to Thomas & Betts Corporation. Wire slitting and installing apparatus. 4,025,998, Cl. 29-566.400.

Erb, David K. Image interpretation instrument. 4,026,631, Cl. 350-35.000.

Erickson, Thomas D.; and Wolf, Warren W., to Owens-Corning Fiberglas Corporation. Glass compositions, fibers and methods of making same. 4,026,715, Cl. 106-50.000.

Erlich, Ricky M.: *See—*
Healey, William E.; Heineman, Morse R.; and Erlich, Ricky M., 4,027,302.

ERNO Raumfahrttechnik GmbH: *See—*
Menke, Manfred, 4,026,341.

Ernst, Richard John: *See—*
Williams, Elbert Eugene, Jr.; and Ernst, Richard John, 4,026,186.

Ernster, Louis G.: *See—*
Robbins, Roy F., 4,026,236.

Esemplare, Pascal E.; and Beeferman, Dennis, to Sutures, Inc. Rubber articles having improved slip coatings. 4,027,060, Cl. 428-212.000.

Essex International, Inc.: *See—*
Turner, Jesse H.; Hurd, Claud C.; and Fiedler, Frank, Jr., 4,026,314.

ETA A.G. Ebauches-Fabrik: *See—*
Giger, Urs; and Perrot, Friedrich, 4,026,104.

Etat Francais: *See—*
Mosnier, Jean Paul, 4,027,234.

Ethyl Corporation: *See—*
Kolich, Charles H.; Braxton, Henry G., Jr.; and Lehikoinen, Urho A., 4,026,964.

Evens, Georges Gerard; and Smets, Georges Joseph, to AGFA-GEVAERT, N.V. Photochromic polycondensates. 4,026,869, Cl. 260-47.0CZ.

Everburg, Donald E., to American Optical Corporation. Tennis players' spectacles. 4,026,640, Cl. 351-120.000.

Ewart, Martin Rodney: *See—*
Johnson, George Arthur; Ewart, Martin Rodney; and Pethica, Brian Anthony, 4,026,814.

Exhal Industries Limited: *See—*
Madden, Albert John; and Spedding, Peter Lee, 4,026,257.

Exxon Research and Engineering Company: *See—*
Baldwin, Francis P.; and Malatesta, Alberto, 4,026,966.
Johnson, Burnett H.; and Huff, Terrence, 4,026,968.

Eymard, Pierre: *See—*
Pigerol, Charles; Eymard, Pierre; Vernieres, Jean-Claude; and Werbenec, Jean-Pierre, 4,026,925.

Ezaki, Norio; Amano, Shoichi; Miyado, Shinji; Ito, Mitsugu; Nojiri, Chuhei; Tsuruoka, Takashi; Yamada, Yujiro; and Niida, Taro, to Meiji Seika Kaisha, Ltd. Antibiotic BN-130 substances and the production thereof. 4,027,014, Cl. 424-122.000.

F. Jos. Lamb Company: *See—*
Stockdale, Thomas C., 4,026,409.

Fairchild Industries Inc.: *See—*
Gruodis, Romualdas K., 4,026,425.

Fan, George J.; and Toupin, Richard A., to International Business Machines Corporation. Method and apparatus for forming droplets from a magnetic liquid stream. 4,027,308, Cl. 346-1.000.

Fansteel Inc.: *See—*,
Emmerich, Kenneth C., 4,026,605.

Fanta, George F.: *See—*
Bagley, Edward B.; Fanta, George F.; Doane, William M.; Gugliemelli, Lewis A.; and Russell, Charles R., 4,026,849.

Farber, Sheldon, to NCR Corporation. Derivatives of dianhydrides as vinyl color formers. 4,026,883, Cl. 260-240.00D.

Farha, Floyd E., Jr.; Johnson, Marvin M.; and Tabler, Donald C., to Phillips Petroleum Company. Solid catalysts for oxidative dehydrogenation of alkenes or alkadienes to furan compounds. 4,026,820, Cl. 252-432.000.

Farrington, Gregory C.; and Roth, Walter L., to General Electric Company. Sealed lithium-sodium electrochemical cell. 4,027,076, Cl. 429-104.000.

Fathauer, George H.; Mathis, Cecil Ernest; and Williamson, Warren L., to Masco Corporation of Indiana. Radio receiver using frequency synthesizer. 4,027,251, Cl. 325-421.000.

Fay, Clarence C. Dual side-by-side master cylinder. 4,026,109, Cl. 60-581.000.

Federal-Mogul Corporation: *See—*
Ladin, Eli M., 4,026,399.

Fedorka, Robert Thomas: *See—*
Carnes, James Edward; Dawson, Robert Herman; Fedorka, Robert Thomas; and Kaiser, Henry William, 4,027,260.

Fedorko, Irvin E. Device for controlling boat speed. 4,026,231, Cl. 114-145.00A.

Fedotenkov, Vyacheslav Georgievich: *See—*
Shmakov, Eduard Ivanovich; Medovar, Boris Izrailevich; Chvertko, Anatoly Ivanovich; Koval, Vladimir Vasilievich; Fedotenkov, Vyacheslav Georgievich; Bondarenko, Oleg Petrovich; Kravchuk, Anatoly Iosifovich; Marchenko, Alexandr Mikhailovich; and Bogachenko, Alexei Georgievich, 4,027,233.

Fedotkin, Igor Mikhailovich; Jukhimets, Anatoly Konstantinovich; and Odery, Leonid Panteleimonovich. Process for preparing oxygenated cocktail. 4,027,045, Cl. 426-312.000.

Feinberg, Irving, to Presto Lock Company, Division of Walter Kidde & Company, Inc. Caster for luggage. 4,026,570, Cl. 280-47.170.

Fekete, Lajos F.: *See—*
Bick, Rodger L.; and Fekete, Lajos F., 4,027,013.

Feldman, Ilya Afanasievich: *See—*
Kasatkin, Alexei Fedoseevich; and Feldman, Ilya Afanasievich, 4,027,111.

Feldman, Martin: *See—*
Appelbaum, Jacob; and Feldman, Martin, 4,026,653.

Femipari Kutato Intezet: *See—*
Orban, Ferenc; Orban, Maria; Pinter, Tihamer; Zsigmond, Gyorgy; Siklosi, Peter; Solymar, Karoly; Toth, Pal; and Zambo, Janos, 4,026,989.

Fenn, Gordon William, to Chrysler Corporation. Engine exhaust gas recirculation (EGR) control system. 4,026,256, Cl. 123-119.00A.

Fettes, Edward M.: *See—*
Chaudhary, Sohan S.; and Fettes, Edward M., 4,026,928.

Fetzer, Fred, to Sam Stein Associates, Inc. Charmarker. 4,026,201, Cl. 99-355.000.

Fiedelman, Howard W., to Morton-Norwich Products, Inc. Process for producing salt having a reduced calcium sulfate content. 4,026,676, Cl. 23-298.000.

Fiedler, Frank, Jr.: *See—*
Turner, Jesse H.; Hurd, Claud C.; and Fiedler, Frank, Jr., 4,026,314.

Field, Harold S.; and Mitchell, Donald K., to Silverman, Daniel. Repetitive detonation seismic surveying method and apparatus. 4,026,382, Cl. 181-117.000.

Fields, Robert Edward; Haag, Charles Walter; and Lindenschmidt, Robert Edward, to Whirlpool Corporation. Method of forming refrigerator liner and shelf supports. 4,026,004, Cl. 29-458.000.

Fierro, Justo Vidaller. Guard for circular saw. 4,026,174, Cl. 83-438.000.

Filatova, Tatyana Grigorievna: *See—*
Bortkevich, Leonid Leonidovich; Burmistrov, Alexandr Georgievich; Karnet, Nikolai Sergeevich; Sevostyanov, Boris Alexandrovich; and Filatova, Tatyana Grigorievna, 4,025,987.

Filip, Stanislaw F., to I.C.S. Ignition Control Systems Ltd. Cable activated switch. 4,027,130, Cl. 200-161.000.

Filipiev, Oleg Vladimirovich: *See—*
Andoniev, Sergei Mikhailovich; Kudinov, Gennady Alexandrovich; Kutsykovich, Dorina Borisovna; Kasyanov, Grigory Ivanovich; Raikovsky, Jury Borisovich; Filipiev, Oleg Vladimirovich; Freidenzon, Evgeny Zakharovich; and Pustovar, Vladimir Semenovich, 4,026,352.

Finger, Richard H., to Klykon, Inc. Air filtration cassette with electrostatic precipitator and having multiple filter elements. 4,026,684, Cl. 55-126.000.

Finkl, Charles W.; and Lehman, Albert L., to A. Finkl & Sons Company. Fatigue reaistant steel, machinery parts and method of manufacture thereof. 4,026,727, Cl. 148-2.000.

Fiorentino, Ermenegildo, to Burroughs Corporation. Carrier diverter gate for conveyor system. 4,026,424, Cl. 214-11.00R.

Firmenich S.A.: *See—*
Becker, Joseph J.; Schulte-Elte, Karl-Heinrich; Strickler, Hugo; and Ohloff, Gunther, 4,026,948.

Fischer, Erhardt: *See—*
Edwards, Douglas Cameron; and Fischer, Erhardt, 4,026,933.

Fischer, Gerhard: *See—*
Schade, Fritz; Strocker, Gunter; and Fischer, Gerhard, 4,026,423.

Fischer, Roman; Fliege, Werner; Keernig, Wolfgang; and Horn, Peter, to BASF Aktiengesellschaft. 4-(m,m'-di-t-butyl-p-hydroxyphenyl) butyl-2 compounds. 4,026,952, Cl. 260-624.00R.

Fisher, Donald K.: *See—*
Wise, Walter R.; Allen, Ellsworth J.; and Fisher, Donald K., 4,026,748.

Fisher, James: *See—*
Colle, Augusto; and Fisher, James, 4,026,246.

Fisher, Robert Leon. Closed flap spring for orthodontic appliances. 4,026,023, Cl. 32-14.00E.

Fisher Scientific Company: *See—*
Mansfield, Ernest Bryant; and Gibboney, Dennis A., 4,026,665.

Fisons Limited: *See—*
Brooker, Peter John; and Goose, John, 4,026,290.

Fitzgerald, Joseph C. Measuring device for water flow in a buried pipe. 4,026,151, Cl. 73-194.00R.

Flanagan, Thomas L., to Emhart Industries, Inc. Apparatus for applying hot melt glue to a surface of an object. 4,026,237, Cl. 118-5.000.

Flexman, Edmund Arthur, Jr.; and Starr, Frank Clyde, Jr., to Du Pont de Nemours, E. I., and Company. Process for making grafted polymeric material. 4,026,967, Cl. 260-878.00R.

Fliege, Werner: *See—*
Fischer, Roman; Fliege, Werner; Keernig, Wolfgang; and Horn, Peter, 4,026,952.

Flint, John R., to Bell & Howell Company. Electronic document detector circuitry with feedback control. 4,027,154, Cl. 250-214.0AG.

Flintoff, Brian C.: *See—*
Bradburn, Ronald G.; Flintoff, Brian C.; Walker, Robert A.; and Dutton, Walter A., 4,026,479.

Floryan, Daniel Edwin; and Fruscione, Paul Caswell, to General Electric Company. Extraction of copper catalyst from polyphenylene oxide solutions. 4,026,870, Cl. 260-47.0ET.

Flow Industries, Inc.: *See—*
Thomas, Benjamin A., 4,026,322.

Floyd, Henry G., to Raymond Lee Organization, Inc., The, a part interest. Manually operable door release for vehicles. 4,026,599, Cl. 296-146.000.

FMC Corporation: *See—*
Castrantas, Harry Marcus; and Gresham, John T., 4,026,798.
Merkert, Clifton S., 4,026,163.

Ford, James M., to Olin Corporation. Adjustable electrode. 4,026,785, Cl. 204-286.000.

Ford Motor Company: *See—*
Belaire, Richard C., 4,026,114.
Boag, John, 4,026,624.

Forderer, Karl: *See—*
Hoppner, Klaus; Landwehr, Gotz; Wilhelm, Adolf; Meyer, Wolfgang; Frers, Gerd; Lohberg, Rolf; Reiff, Dieter; Forderer, Karl; and Kosiollek, Helmut, 4,026,020.

Forenade Fabriksverken: *See—*
Akhagen, Rune Verner; Tisell, Claes Gustav Erik Yngve; and Andersson, Anders Hakan, 4,026,189.

Ostling, Hans Martin, 4,026,211.
Forster, Franz, to Linde Aktiengesellschaft. Axial piston machine of adjustable stroke. 4,026,195, Cl. 91-506.000.
Foster, Brian; and Mortimer, Frank Radcliffe, to Dunlop Limited. Liquid/gas suspension systems. 4,026,579, Cl. 280-705.000.
Foster, Keith; and Smith, Philip, to Secretary of State for Industry in Her Britannic Majesty's Government of the United Kingdom of Great Britain & Northern Ireland. Driving tools. 4,026,370, Cl. 175-20.000.
Foulis, Michael John: *See—*
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Fournex, Robert: *See—*
Poittevin, Andre; Fournex, Robert; and Dagnaux, Michele, 4,027,030.
Fowler, Charles F.; and Dawson, Samuel G. Method and apparatus for temperature probe cover with provision for sanitary disposal. 4,026,751, Cl. 156-306.000.
Fowler, Hugh; Ruben, Murray A.; Dumais, Richard L.; and Collings, Robert F., to Data Terminal Systems, Inc. Electronic cash register. 4,027,140, Cl. 235-7.00R.
Fowler, Leslie L., to Mapco, Inc. Magnetic filter. 4,026,805, Cl. 210-223.000.
Fox, Ronald L.: *See—*
Mungle, Charles R.; and Fox, Ronald L., 4,026,978.
Frank, Walter; Raichle, Karl; and Kreiss, Eberhard, to Bayer Aktiengesellschaft. Thixotropic urethane alkyd resins. 4,026,850, Cl. 260-22.0TN.
Frankel, Harry; Levit, Heim; and Nahir, David, to State of Israel, Ministry of Agriculture, The. Apparatus for spraying bushes and trees. 4,026,469, Cl. 239-78.000.
Frantz, Robert M.: *See—*
Dammel, Howard W.; Frantz, Robert M.; Luke, James H.; and Skrzypczyk, William G., 4,026,732.
Fraunhofer-Gesellschaft zur Forderung der angewandten Forschug e.V.: *See—*
Goebbels, Klaus, 4,026,157.
Frechin, Jean-Paul, to Garcia Corporation. Self restoring releasable ski binding. 4,026,576, Cl. 280-613.000.
Frechin, Jean-Paul, to Garcia Corporation. Self-restoring ski binding having single tensioning means. 4,026,577, Cl. 280-613.000.
Frederick, Carlton L.: *See—*
Witriol, Norman M.; and Frederick, Carlton L., 4,027,143.
Frederick, James E., to Westinghouse Electric Corporation. Environmentally protected arc welding apparatus of the forced ventilation type. 4,027,205, Cl. 361-384.000.
Freeman, Charles F.: *See—*
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Freeman, William R., Jr., to Avco Corporation. Cooled composite vanes for turbine nozzles. 4,026,659, Cl. 415-115.000.
Freidenzon, Evgeny Zakharovich: *See—*
Andoniev, Sergei Mikhailovich; Kudinov, Gennady Alexandrovich; Kutsykovich, Dorina Borisovna; Kasyanov, Grigory Ivanovich; Raikovsky, Jury Borisovich; Filipiev, Oleg Vladimirovich; Freidenzon, Evgeny Zakharovich; and Pustovar, Vladimir Semenovich, 4,026,352.
French, Lawrence T., Jr.: *See—*
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Frey, Christian; and Moser, Peter, to Ciba-Geigy Corporation. Process for the manufacture of cationic hydrazone dyes. 4,026,885, Cl. 260-240.00G.
Friedman, Harry G.; and Wickham, Robert W., Jr., to Medtronic, Inc. Apparatus and method for optimum electrode placement in the treatment of disease syndromes such as spinal curvature. 4,026,301, Cl. 128-418.000.
Friedrich, Richard A.; and MacNeill, Robert L., to National Medical Care, Inc. Dialysis apparatus. 4,026,800, Cl. 210-87.000.
Friedrich Uhde GmbH: *See—*
Marsch, Hans-Dieter, 4,026,675.
Frink, Richard C., to Simmonds Precision, Engine Systems, Inc. Regulatable permanent magnet alternator. 4,027,229, Cl. 322-50.000.
Frohberger, Paul-Ernst; and Gauss, Walter, to Bayer Aktiengesellschaft. Combating heminthosporium fungi with 2-[3',5'-dimethylpyrazolyl-(1')]-benzimidazole. 4,027,032, Cl. 424-273.000.
From, Anatoly Alexandrovich: *See—*
Kiselev, Anatoly Efimovich; Skurkovich, Semen Vladimirovich; Golosova, Tatyana Vasilievna; From, Anatoly Alexandrovich; Papko, Grigory Fedoseevich; Shenkman, Ljudmila Semenovna; and Anikina, Tatyana Pavlovna, 4,027,010.
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Fuji Denki Seizo Kabushiki Kaisha: *See—*
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Fujimoto, Kazumi: *See—*
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Fujimoto, Yoshinobu: *See—*
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Fujinami, Nobuakira: *See—*
Nagano, Tadashi; and Fujinami, Nobuakira, 4,026,291.
Fujino, Katsuhiro. Plasma etching process for making a microcircuit device. 4,026,742, Cl. 156-643.000.
Fujita, Yoshiji: *See—*
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Tokura, Koichi; and Kaneda, Saburo, 4,027,291.
Fujiwara, Yoshio; Naito, Keiichi; Fujimoto, Yoshinobu; Odashima, Tooru; and Sada, Tomohiko, to Sony Corporation. Flame retardant thermosetting resin. 4,027,063, Cl. 428-273.000.
Fukinbara, Itaru: *See—*
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Fukubayashi, Haruhisa; and Dressel, Waldemar M., to United States of America, Interior. Preparation of PbO_2anode. 4,026,786, Cl. 204-290.00F.
Fukui, Kiyotake; Matsushima, Hiroshi; and Ishigaki, Yukinobu, to Matsushita Electric Industrial Co., Ltd.; and Victor Company of Japan, Limited. Phase locked loop circuit. 4,027,274, Cl. 332-19.000.
Fukuoka, Hiroshi: *See—*
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Fukushima, Yoshio, to Ricoh Co., Ltd. Directional light transmitting screen. 4,026,634, Cl. 350-128.000.
Fuller, Walter Leonard, to Norlin Music, Inc. Magnetic pickup for stringed musical instrument. 4,026,178, Cl. 84-1.160.
Fulmer, Donald W.: *See—*
Purcupile, John Charles; Lenden, Angela L.; Mutschler, Thomas A.; Kneisley, Joel D.; Wieszczyk, Mark P.; Lasser, Ronald; and Fulmer, Donald W., 4,026,116.
Funiciello, Angelo. Explosion internal-combustion engines. 4,026,250, Cl. 123-32.00B.
Furst, Andor; Muller, Marcel; Alig, Leo; Keller, Peter; Kerb, Ulrich; Wiechert, Rudolf; Kieslich, Klaus; and Petzoldt, Karl. D-homosteroids. 4,026,918, Cl. 260-488.00B.
Furst, Andor; Muller, Marcel; Alig, Leo; Keller, Peter; Kerb, Ulrich; Wiechert, Rudolf; Kieslich, Klaus; and Petzoldt, Karl. D-homosteroids. 4,026,921, Cl. 260-488.00B.
Furst, Andor: *See—*
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Furst, Zsuzsanna: *See—*
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Furukawa, Masamichi: *See—*
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Fusayama, Takeo: *See—*
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Futamase, Tsuyoshi, to Nippon Gakki Seizo Kabushiki Kaisha. Electronic musical instrument. 4,026,179, Cl. 84-1.240.
G.E.K. Enterprises, Inc.: *See—*
Karkoska, George E., 4,026,554.
G.M. Root, Inc.: *See—*
Root, Glenn M.; Root, Ronald G.; and Root, Richard A., 4,025,981.
Gagneux, Andre; Heckendorn, Roland; and Meier, Rene, to Ciba-Geigy Corporation. Diazepine derivatives. 4,027,029, Cl. 424-269.000.
Gaidar, Igor Longinovich: *See—*
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Gailus, Walter J.; Lam, Robert; and Patel, Jayadev P., to Continental Group, Inc., The. Pre-loaded ram-tool holder energy absorbing mechanism. 4,026,207, Cl. 100-214.000.
Gajjar, Bharat Jaybhadra, to Du Pont de Nemours, E. I., and Company. Method of warp knitting. 4,026,130, Cl. 66-203.000.
Gaku, Morio: *See—*
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Galasso, Francis S.; Kuntz, Urban E.; and Delgrosso, Eugene J., to United Technologies Corporation. High temperature titanium braze foil. 4,026,677, Cl. 428-649.000.
Gamex Industries Inc.: *See—*
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Ganellin, Charon Robin: *See—*
Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, 4,027,026.
Gange, Robert Allen, to RCA Corporation. Method and apparatus for cataphoretic deposition. 4,026,780, Cl. 204-181.000.
Ganguly, Ashit K.: *See—*
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Garcia, Alberto: *See—*
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Frechin, Jean-Paul, 4,026,576.
Frechin, Jean-Paul, 4,026,577.
Gardiner, Robert A., to Minnesota Mining and Manufacturing Company. Acid modified phenol-aldehyde resinous condensation products and friction particles therefrom. 4,026,867, Cl. 260-46.000.
Garlock Inc: *See—*
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Garlock Inc.: *See—*
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Gauthier, John A.: *See—*
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Gavrilova, Ivana; and Hudecek, Slavko, to Ceskoslovenska akademie ved. Powdery hydrophilic fillers. 4,027,082, Cl. 526-15.000.
Gazzarini, Vinicio, to Barilla G. & R. F.lli S.p.A. Machine for withdrawing bread slices or like products from a continuous cycle belt-type baking oven, and presenting them in a horizontal stack. 4,026,406, Cl. 198-420.000.
Gebhardt, Hans; Prahl, Franz; Popescu, Corneliu Mircea; and Schorwerth, Mathias, to Knorr-Bremse GmbH. Brake disc for disc brakes on rail vehicles. 4,026,393, Cl. 188-218.0XL.
Gebr. Eickhoff, Maschinenfabrik und Eisengiesserei m.b.H.: *See—*
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Gee, James E., to Caterpillar Tractor Co. Underwater tractor and intake and exhaust means therefor. 4,026,375, Cl. 180-54.00A.
Geiger, Willard L.; and Williams, John D., to Harmon Industries, Inc. Variable high pass coupler. 4,026,505, Cl. 246-34.00R.
Gellert, Jobst Ulrich. Bushing seal for valve-gated injection mold. 4,026,518, Cl. 251-330.000.
Gelotte, Kari O.; Zalay, Andrew W.; and Bell, Malcolm R., to Sterling Drug Inc. 3-(Pyridinyl)-2-cyclohexen-1-ones. 4,026,900, Cl. 260-296.00M.
Genberg, Hans-Arvid, to AB Gotaverken Company. Apparatus for stowing an anchor. 4,026,232, Cl. 114-210.000.
General Atomic Company: *See—*
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General Dynamics Corporation: *See—*
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General Electric Company: *See—*
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General Resource Corporation: *See—*
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General Tire & Rubber Company, The: *See—*
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Genesi, Robert C., to Sprague Electric Company. Integrated full wave diode bridge rectifier. 4,027,325, Cl. 357-48.000.
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Georg, Werner, to Gewerkschaft Eisenhutte Westfalia. Conveyors for mineral mining installations. 4,026,407, Cl. 198-735.000.
Georg, Werner, to Gewerkschaft Eisenhutte Westfalia. Mining installations. 4,026,603, Cl. 299-34.000.
Gerard, Robert. Manual encaping and recaping device for bottles sealed with crown caps. 4,026,170, Cl. 81-3.430.
Gerber Products Company: *See—*
Wengel, Sheldon M., 4,026,067.
Gericke, Otto R.; Grubinskas, Robert C.; and McKeraghan, Roy A., to United States of America, Army. Apparatus for the generation of polychromatic ultrasonographs. 4,026,144, Cl. 73-67.600.
Gernitis, Jeffrey; and Butti, Bruno, to International Telephone & Telegraph Corporation. Ceramic mounting and heat sink device. 4,025,997, Cl. 428-621.000.
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Gerve, Andreas; Haury, Hartmut; and Lausch, Wolfram, to Gesellschaft fur Kernforschung m.b.H. Device for measuring wear by radioactive radiation. 4,027,157, Cl. 250-303.000.
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Giddings, Brandford E.; and Eggett, Janet M., to Standard Oil Company. Mercaptan-hydrocarbon chain modifiers in acrylonitrile copolymers. 4,027,090, Cl. 526-224.000.
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Gilbrech, Donald A. Tuning peg. 4,026,182, Cl. 84-305.000.
Gillemot, George W., to Thompson, John T., a part interest. High capacity solderless bonding assembly for shielded cables. 4,026,619, Cl. 339-14.00R.
Gillemot, George W., to Thompson, John T., a part interest. Split cover plate for telephone outlet. 4,027,097, Cl. 174-66.000.
Gillette Company, The: *See—*
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Gillman, Hyman D.; and King, James P., to United States of America, Navy. Poly[tantalum phosphinates]. 4,026,830, Cl. 260-2.00P.
Gilmore, Charles Minot, to Heath Company. High speed accurate low frequency counter. 4,027,146, Cl. 235-151.310.
Gilmore, L. Donald: *See—*
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Pickering, John Flory, 4,026,319.
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Giros, Marcel A. P. Apparatus for treatment of elongated flexible material. 4,026,450, Cl. 226-42.000.
Giros, Marcel A. P. Method for treatment of elongated flexible material. 4,026,724, Cl. 134-14.000.
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Glasoe, Ronald M. Evaporative cooler. 4,026,971, Cl. 261-29.000.
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Glory Kogyo Kabushiki Kaisha: *See—*
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Goebbels, Klaus, to Fraunhofer-Gesellschaft zur Forderung der angewandten Forschug e.V. Method of quantitatively determining the grain size of substances. 4,026,157, Cl. 73-432.0PS.
Goebel, Ronald G. Retractor for one-way screw. 4,026,338, Cl. 145-50.00A.
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Goloff, Alexander, to Caterpillar Tractor Co. Bearings for slant axis rotary mechanisms. 4,026,662, Cl. 418-53.000.
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Good, Maurice James, to Starboard Industries, Inc. Press blocking and air logic control system. 4,026,204, Cl. 100-53.000.
Goodlaxson, John D., to Maytag Company, The. Faucet coupler assembly. 4,026,323, Cl. 137-562.000.
Goodman, David S.; and Borsuk, Leslie M., to International Telephone and Telegraph Corporation. Zero force connector. 4,026,623, Cl. 339-75.00M.
Goodman, Willard B.: *See—*
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Grant, Wayne T., to United States of America, Army. Standby illuminator for remote controlled viewer. 4,027,334, Cl. 358-210.000.
Gratzmuller, Jean Louis. Hydraulic jacks. 4,026,523, Cl. 254-93.00R.
Grausz, Henry, to Grausz Investment Co. Artificial urethra. 4,026,298, Cl. 128-349.00R.
Grausz Investment Co.: *See—*
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Grayzel, Joseph. Method of implanting a permanent pacemaker bipolar lead apparatus and an implantable permanent pacemaker bipolar lead apparatus. 4,026,302, Cl. 128-418.000.
Grazzini, Giulio: *See—*
Vargiu, Silvio; Crespolini, Giancarlo; and Grazzini, Giulio, 4,026,761.
Greaves, Melvin J.; and Razgaitis, Frank V., to Arthur G. McKee & Co. Charging apparatus for receptacles. 4,026,427, Cl. 214-36.000.
Green, Cyril Robert, to Medio, Mario D.; and Medio, Grace E. Cable cutting device. 4,026,028, Cl. 30-233.000.
Green, Harold A.; Merianos, John J.; and Petrocci, Alfonso N., to Millmaster Onyx Corporation. Anti-microbial quaternary ammonium co-polymers. 4,026,945, Cl. 260-567.60P.
Green, Harold A.; Merianos, John J.; and Petrocci, Alfonso N., to Millmaster Onyx Corporation. Randomly terminated capped polymers. 4,027,020, Cl. 424-248.560.
Greene, Robin Nikolas, to Du Pont de Nemours, E. I., and Company. Acrylate polymers cured with diamines in the presence of an acid catalyst. 4,026,851, Cl. 260-23.0AR.
Gresham, John T.: *See—*
Castrantas, Harry Marcus; and Gresham, John T., 4,026,798.
Greskovich, Charles D., to General Electric Company. Method for making investment casting molds for casting of superalloys. 4,026,344, Cl. 164-26.000.
Greve, Gordon M.; Hadley, Charles F.; Read, Randol R.; and Supernaw, John W., to Standard Oil Company. Digital recording of sonic log wavetrains. 4,027,281, Cl. 340-15.5GC.
Grier, Nathaniel; Hoover, Merwin F.; Huff, Jesse W.; and Kuron, Gunther W., to Merck & Co., Inc. Compositions and methods for depressing blood serum cholesterol. 4,027,009, Cl. 424-78.000.
Grix, Arthur R., to Wagner Electric Corporation. Flow reversing regenerative air dryer. 4,026,685, Cl. 55-213.000.
Grodzitsky, Stanislav Vitalievich: *See—*
Medovar, Boris Izrailevich; Kumysh, Ilya Iosifovich; Boiko, Georgy Alexandrovich; Grodzitsky, Stanislav Vitalievich; Arkhipov, Nikolai Vasilievich; and Skoropupov, Anatoly Nikolaevich, 4,027,092.
Grof, Tibor T.; and De La Cruz, Gloven G., to Arcal Chemicals, Inc. Admixture of alkali-metal nitrate with water-soluble condensate of sulfonated aromatic hydrocarbon and aliphatic aldehyde. 4,026,723, Cl. 106-315.000.
Gross, George E., to Illinois Tool Works Inc. Plastic screw grommet. 4,026,187, Cl. 85-72.000.
Gross, James Richard; Potter, James Larry; and Kassell, Frederick Bernhard, to Dow Chemical Company, The. Method for converting alkenoic acid copolymer latexes into water solutions. 4,026,932, Cl. 260-29.60H.
Grossman, Arthur: *See—*
Bowditch, Philip N.; Toth, William E.; and Grossman, Arthur, 4,026,156.
Grot, Walther Gustav, to Du Pont de Nemours, E. I., and Company. Electrolysis cell using cation exchange membranes of improved permselectivity. 4,026,783, Cl. 204-266.000.
Grove, Marvin H., to M & J Valve Company. Flow control apparatus. 4,026,515, Cl. 251-172.000.
Grove Valve and Regulator Company: *See—*
Callenberg, Russell J., 4,026,513.
Grow, Harlow B., to Grow, Mark S.; Madden, Bonnie B.; and Grow, Michael J., part interest to each. Aircraft wing with internal flow control propulsion. 4,026,500, Cl. 244-36.000.
Grow, Mark S.: *See—*
Grow, Harlow B., 4,026,500.
Grow, Michael J.: *See—*
Grow, Harlow B., 4,026,500.
Grubinskas, Robert C.: *See—*
Gericke, Otto R.; Grubinskas, Robert C.; and McKeraghan, Roy A., 4,026,144.
Grudzewski, Adam: *See—*
Kosek, Andrzej; and Grudzewski, Adam, 4,026,107.
Grumbeck, Victor N., to Beauti-Vue Products Corporation. Sunburst wall plaque or the like and method of making the same. 4,027,057, Cl. 428-32.000.
Grumman Aerospace Corporation: *See—*
Duffner, Morris V.; and Mintz, Alexander, 4,026,628.
Grunert, Gerhard, to Siemens Aktiengesellschaft. Shorting and grounding arrangement for gas-insulated bus bars. 4,027,126, Cl. 200-148.00B.
Gruodis, Romualdas K., to Fairchild Industries Inc. Article collection apparatus. 4,026,425, Cl. 214-16.00B.
Gryaznov, Vladimir Mikhailovich; Polyakova, Viktoria Petrovna; Savitsky, Evgeny Mikhailovich; and Khrapova, Evgenia Vladimirovna. Catalyst for dehydrogenation or dehydrocyclization of hydrocarbons. 4,026,958, Cl. 260-668.00D.
GTE Automatic Electric (Canada) Limited: *See—*
Moorehead, Thomas J.; and Gauthier, John A., 4,027,108.
GTE Automatic Electric Laboratories Incorporated: *See—*
Macrander, Max S.; and Kowalik, Ronald F., 4,027,235.
Zellmer, Neale A., 4,027,259.
GTE Laboratories Incorporated: *See—*
Schlafer, John; Williams, G. Norman; and Wilson, Robert F., 4,027,312.
GTE Sylvania Incorporated: *See—*
Arumugham, Rangaswamy, 4,027,252.
Benasutti, John Eugene, 4,026,627.
Pitel, Ira Jay, 4,027,270.
Schlafer, John; Williams, G. Norman; and Wilson, Robert F., 4,027,312.
Guaranty Performance Co., Inc.: *See—*
Livingston, Andrew D., 4,026,678.
Guaschino, Giancarlo: *See—*
Belforte, Piero; Guaschino, Giancarlo; and Perucca, Giovanni, 4,027,106.
Gugliemelli, Lewis A.: *See—*
Bagley, Edward B.; Fanta, George F.; Doane, William M.; Gugliemelli, Lewis A.; and Russell, Charles R., 4,026,849.
Guild, Charles L.; and Goodman, Willard B. Expansible mandrel. 4,026,117, Cl. 61-53.720.
Guiley, Clifford Dale, Jr.: *See—*
Backderf, Richard Harold; and Guiley, Clifford Dale, Jr., 4,026,970.
Gulbenk, Alin H., to Dow Chemical Company, The. Substituted pyridinylalkoxy-pyridinylalkylsulfonyl- and pyridinylalkylthiophenylureas. 4,026,937, Cl. 260-293.690.
Gulf & Western Industries, Inc.: *See—*
DeLille, Richard A.; Curnan, William A.; and DeGryse, Gentiel M., 4,027,144.
Gunn, William L. Adjustable elastic type exercising device. 4,026,549, Cl. 272-137.000.
Gunter, William D., Jr., to United States of America, National Aeronautics and Space Administration. Pseudo-backscatter laser doppler

velocimeter employing antiparallel-reflector in the forward direction. 4,026,655, Cl. 356-28.000.

Gunton, David John; and Paige, Edward George Sydney, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Directional coupler having interdigital comb electrodes. 4,027,254, Cl. 333-10.000.

Gurzheev, Valery Nikolaevich: *See*—
Berezin, Gennady Nikolaevich; Gurzheev, Valery Nikolaevich; Zakharov, Vladimir Ivanovich; Nikitin, Arkady Viktorovich; and Suris, Robert Arnoldovich, 4,026,743.

Gustav Schade Maschinenfabrik: *See*—
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Gutierrez, Eddie N.: *See*—
Lamberti, Vincent; and Gutierrez, Eddie N., 4,026,813.

Gutierrez, Julian. Tea kettle structure. 4,026,274, Cl. 126-390.000.

Gutleber, Frank S., to United States of America, Army. Phase lock loop multitone interference canceling system. 4,027,264, Cl. 328-167.000.

Gutteridge, Norman James Albert: *See*—
Dawson, William; Foulis, Michael John; Gutteridge, Norman James Albert; and Smith, Colin William, 4,027,036.

H. Bieri AG, Liebefeld: *See*—
Bieri, Hans, 4,026,602.

H. H. Robertson Company: *See*—
Hoener, Ralph H., Jr., 4,025,984.

Haag, Charles Walter: *See*—
Fields, Robert Edward; Haag, Charles Walter; and Lindenschmidt, Robert Edward, 4,026,004.

Haarmann & Reimer GmbH: *See*—
Bauer, Kurt; Molleken, Reiner; and Krempel, Alfred, 4,026,929.
Bauer, Kurt; and Molleken, Reiner, 4,026,951.

Haase, Jaroslav: *See*—
Wegmuller, Hans; and Haase, Jaroslav, 4,026,796.

Haase, Ralf: *See*—
Printz, Gerhard; and Haase, Ralf, 4,026,753.

Hackmeister, Richard. Touch-responsive circuit and data input terminal using same. 4,027,306, Cl. 340-365.00C.

Haderer, Edward G.; Sawoski, Edward J.; and Shanebrook, Robert E., to Cutler-Hammer, Inc. Yarn trapper for yarn detector switch. 4,027,121, Cl. 200-61.130.

Hadley, Charles F.: *See*—
Greve, Gordon M.; Hadley, Charles F.; Read, Randol R.; and Supernaw, John W., 4,027,281.

Hagger Company: *See*—
Off, Joseph W. A.; and Early, Judson Horace, 4,026,172.

Hahn, Kurt L.; and Allen, Robert J., to American Can Company. Press apparatus and method utilizing same. 4,026,226, Cl. 113-1.00F.

Haig, Frederic David. Method and apparatus for electrostatic coating. 4,027,050, Cl. 427-27.000.

Haines, David C.: *See*—
Shupe, Robert N.; and Haines, David C., 4,026,219.

Hale Bros. Associates: *See*—
Dirks, Gerhard, 4,027,287.

Hallam, Beverly Grant Rutledge. Triple hinged folding T frame wheelchair. 4,026,568, Cl. 280-42.000.

Hallamore Inc.: *See*—
Conley, Challie, 4,026,381.

Haller, Irene. Syringe with retractable cannula. 4,026,287, Cl. 128-215.000.

Halliburton Company: *See*—
Tallant, James L., 4,026,120.

Hamelink, William B., to Honeywell Inc. Resistive fluid detecting means. 4,027,172, Cl. 307-118.000.

Hamlin, Thomas J.: *See*—
Stange, Klaus K.; Smith, Richard E.; Hamlin, Thomas J.; and Cassano, James R., 4,026,542.

Hammann, Ingeborg: *See*—
Daum, Werner; Behrenz, Wolfgang; Hammann, Ingeborg; Scheinpflug, Hans; and Brandes, Wilhelm, 4,026,934.

Hammond, Peter R.: *See*—
Henry, Ronald A.; Hammond, Peter R.; Schimitschek, Erhard J.; and Trias, John A., 4,026,898.

Hampson, John Raymond, to Padley & Venables Limited. Drill bits. 4,026,372, Cl. 175-410.000.

Hanada, Minoru: *See*—
Tomita, Koji; Kobaru, Seikichi; Hanada, Minoru; and Tsukiura, Hiroshi, 4,026,766.

Hanak, Joseph John, to RCA Corporation. Electroluminescent device comprising electroluminescent layer containing indium oxide and/or tin oxide. 4,027,192, Cl. 313-498.000.

Hanaoka, Tadashi: *See*—
Sugimoto, Keiichi; Nishijima, Koji; Akimoto, Hiroshi; Hanaoka, Tadashi; and Kakeya, Nobuharu, 4,026,940.

Hanchett, Leland J., Jr. Door locking mechanism. 4,026,589, Cl. 292-341.160.

Hansen, Knud Verner: *See*—
Werdelin, Hans Kristian; Hansen, Knud Verner; and Andersen, Jens Holst, 4,026,332.

Hansen, Walter: *See*—
Klepper, Herbert; Hansen, Walter; Harris, Joel S.; and Golesorkhi, Farrokh, 4,027,313.

Hanson, Delon C.: *See*—
Brown, William W.; Hanson, Delon C.; and Hornak, Thomas, 4,027,152.

Harada, Yuho, to Fuji Photo Optical Co., Ltd. View finder for reflex camera. 4,027,327, Cl. 354-201.000.

Harding, James; and McCarthy, Neil Justin, Jr., to Union Carbide Corporation. Aqueous phenolic resole dispersion containing gum ghatti interfacial agent. 4,026,848, Cl. 260-17.200.

Harima, Kyujiro, to Sisco Co. Ltd. Process of producing hygienically wrapped, printed and molded chocolate cakes in envelopes simultaneously functioning as display covers. 4,027,047, Cl. 426-383.000.

Harita, Kozaburo; Ajisawa, Yukiyoshi; Iizuka, Kinji; Toda, Michio; Kinoshita, Yukihiko; Kamijo, Tetsuhide; and Kobayashi, Michihiro, to Kissei Yakuhin Kogyo Kabushiki Kaisha (Kissei Pharmaceutical Co. Ltd.). Aromatic amidocarboxylic acids and pharmaceutical compositions thereof. 4,026,896, Cl. 424-282.000.

Harjapaa, Osmo Viljam, to AB Calator. Apparatus for folding and pressing garments. 4,026,444, Cl. 223-37.000.

Harman, Jefferson H., to Pertec Computer Corporation. Speed control for a motor. 4,027,217, Cl. 318-313.000.

Harmon Industries, Inc.: *See*—
Geiger, Willard L.; and Williams, John D., 4,026,505.

Harris, Henry H., to Clark, Elizabeth. Fish hook setter. 4,026,058, Cl. 43-15.000.

Harris, Joel S.: *See*—
Klepper, Herbert; Hansen, Walter; Harris, Joel S.; and Golesorkhi, Farrokh, 4,027,313.

Harris, John William, to Timsons Limited. Method of and machinery for producing bookblocks. 4,026,537, Cl. 270-14.000.

Harris, Philip H.; Sewell, Virgil L.; and Stevens, James. L., to Texas Industries, Inc. Economical, finely controlled cement production. 4,026,717, Cl. 106-100.000.

Hartbauer, Ellswo.th A.; and Weis, Rudolf R., to Crown Zellerbach Corporation. Tail securing apparatus. 4,026,752, Cl. 156-457.000.

Hartman, John T.: *See*—
Newman, Frederick S.; Thorne, John R.; and Hartman, John T., 4,026,781.

Hartmann, Franz; Luck, Heinrich; and Golnitz, Holger, to Nordischer Maschinenbau Rud. Baader. Method and apparatus for controlling the tools and guides of a fish dressing machine. 4,025,988, Cl. 17-52.000.

Hartung, Donald H., to Cue Products, Inc. Pool glove. 4,025,962, Cl. 2-161.00A.

Hartwig, Peter Rudolf, to Schloemann-Siemag Aktiengesellschaft. Plastic ski. 4,026,575, Cl. 280-610.000.

Hasegawa, Masanaru: *See*—
Hayashi, Yoshiki; Hasegawa, Masanaru; Fusayama, Takeo; Kosuge, Kazuhiko; and Hayashi, Kenji, 4,026,703.

Hasegawa, Osamu: *See*—
Murakami, Masuo; Inukai, Noriyoshi; Iwamoto, Hidenori; Tamura, Toshinari; Yanagisawa, Isao; Hasegawa, Osamu; Ishii, Yoshio; Matsuda, Hideya; Shiozaki, Tetsuya; and Tomioka, Kenichi, 4,026,927.

Hashimoto, Kengi: *See*—
Takahari, Tomoo; Kondo, Shiyuichi; Sone, Nobumasa; Hashimoto, Kengi; and Ishiguro, Tadashi, 4,026,737.

Hashimoto, Kenzo, to Nishimura Seisakusho Co., Ltd. Apparatus for holding cylindrical winding cores. 4,026,488, Cl. 242-72.00B.

Haskel, Lawrence Martin: *See*—
Kirschner, Wallace; and Haskel, Lawrence Martin, 4,026,555.

Hata, Shun-ichi; Mizuno, Koji; Nishii, Yasuho; Mitsuishi, Etsuko; and Shiba, Motoharu, to Chugai Seiyaku Kabushiki Kaisha. Method of treating alcoholism. 4,027,017, Cl. 424-200.000.

Hatch, Burton D., to General Electric Company. Liquid-gas phase separation for self-contained liquid metal current collectors. 4,027,183, Cl. 310-219.000.

Hatch, Donald M.; and Larsen, Richard J., to Hitco. High temperature consolidation process. 4,026,745, Cl. 156-155.000.

Haury, Hartmut: *See*—
Gerve, Andreas; Haury, Hartmut; and Lausch, Wolfram, 4,027,157.

Hauser, Raimund; and Wessner, Harald, to Vockenhuber, Karl; and Hauser, Raimund. Camera. 4,027,317, Cl. 354-289.000.

Havas, Jeno: *See*—
Berky, Denes; Damokos, Tamas; Havas, Jeno; and Muller, Henrik, 4,026,774.

Haviv, Fortuna; and Patchornik, Abraham, to Yeda Research & Development Co. Ltd. Cephalosporin antibiotics. 4,026,887, Cl. 260-243.00C.

Hawthorn Leslie (Engineers) Limited: *See*—
Crowdy, Edmund Porter, 4,026,353.

Hawthorne, Vaughn T., to Keystone Industries, Inc. Hydraulic cushioning unit with a gas return. 4,026,418, Cl. 213-8.000.

Hayashi, Kenji: *See*—
Hayashi, Yoshiki; Hasegawa, Masanaru; Fusayama, Takeo; Kosuge, Kazuhiko; and Hayashi, Kenji, 4,026,703.

Hayashi, Yoshiki; Hasegawa, Masanaru; Fusayama, Takeo; Kosuge, Kazuhiko; and Hayashi, Kenji, to Matsushita Electric Industrial Co., Ltd. Dual-layered photoreceptor use in electrophotography. 4,026,703, Cl. 96-1.500.

Healey, William E.; Heineman, Morse R.; and Erlich, Ricky M., to W. E. Healey & Associates, Inc. Double detection circuit for conserving energy in fire detection systems and the like. 4,027,302, Cl. 340-227.00R.

Heath Company: *See*—
Gilmore, Charles Minot, 4,027,146.

Heath, Vernon Ernest. Model aircraft construction jig. 4,026,535, Cl. 269-45.000.

Heckendorn, Roland: *See—*
Gagneux, Andre; Heckendorn, Roland; and Meier, Rene, 4,027,029.
Hegarty, Charles Paul; and Pietryk, Helen C., to American Home Products Corporation. Method of viral chemoprophylaxis and compounds therefor. 4,027,039, Cl. 424-326.000.
Heidelberger Druckmaschinen Aktiengesellschaft: *See—*
Wirz, Arno; Becker, Willi; and Maul, Bernhard, 4,026,209.
Heider, Joachim: *See—*
Austel, Volkhard; Kutter, Eberhard; Heider, Joachim; Eberlein, Wolfgang; Kadatz, Rudolf; and Diederen, Willi, 4,026,891.
Heierli, Walter: *See—*
Piller, Bernhard; Tschopp, Paul; Stauner, Thomas; and Heierli, Walter, 4,026,709.
Heile, William A., to United States of America, Navy. Airborne microwave refractometer. 4,027,237, Cl. 324-58.50C.
Heinecke, Rudolf A. H., to ITT Industries, Inc. Zero point switching thyristor having an isolated emitter region. 4,027,322, Cl. 357-38.000.
Heineman, Morse R.: *See—*
Healey, William E.; Heineman, Morse R.; and Erlich, Ricky M., 4,027,302.
Heinrich Koppers Gesellschaft mit beschrankter Haftung: *See—*
Stanke, Walter; and Mertens, Gottfried, 4,025,979.
Helm, Harry A.: *See—*
Bittel, Raymond H.; Helm, Harry A.; and Raffensperger, Maurice J., 4,027,263.
Henderson, E. Webb, to Phillips Petroleum Company. Apparatus for producing carbon black. 4,026,670, Cl. 23-259.500.
Henderson, James M.; and Pfeiffer, John B., to Asarco Incorporated. Process for recovering sulfur from sulfur dioxide. 4,027,001, Cl. 423-570.000.
Hendon, Joseph S. Disposable cookware. 4,026,435, Cl. 220-85.00H.
Hendrix, Edward M. Vaccinating and beak-holding accessory for a bird processor. 4,026,289, Cl. 128-223.000.
Hennells, Ransom J. Shock absorber with conical control elements. 4,026,533, Cl. 267-124.000.
Henriques, Joseph. Portable fireplace heating unit. 4,026,264, Cl. 126-123.000.
Henry, Ronald A.; Hammond, Peter R.; Schimitschek, Erhard J.; and Trias, John A., to United States of America, Navy. 7-Oxo-1,2,3,3,8-pentamethyl-5-trifluoromethyl-2,3,7,8-tetrahydro-1-H-pyrrolo[3,2-g] quinoline, a stable, efficient laser dye. 4,026,898, Cl. 260-288.0CF.
Hensley, Walter R.: *See—*
Browder, Joe B.; Bythewood, R. Courtenay; and Hensley, Walter R., 4,027,171.
Henson, Richard D. Electronic circuit carrier and test fixture. 4,026,412, Cl. 206-331.000.
Heppner, Paul; and Pohlmann, Gottfried, to Blaupunkt-Werke GmbH. Head-rest and loudspeaker combination. 4,027,112, Cl. 179-146.00H.
Herbrand, Willy, deceased: *See—*
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Hercules Incorporated: *See—*
Cessna, Lawrence C., Jr., 4,026,859.
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Cessna, Lawrence C., Jr., 4,026,861.
Hergeth, Herbert: *See—*
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Hergeth KG Maschinenfabrik und Apparatebau: *See—*
Naarding, Bill J.; and Hergeth, Herbert, 4,025,989.
Herman Miller, Inc.: *See—*
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Hermann Kronseder Maschinenfabrik: *See—*
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Hermecz, Istvan: *See—*
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Herrle, Karl; Denzinger, Walter; Seelert, Kurt; and Schwarz, Wolfgang, to BASF Aktiengesellschaft. Manufacture of polyvinylpyrrolidone-iodine. 4,027,083, Cl. 526-23.000.
Hertler, Walter Raymond, to Du Pont de Nemours, E. I., and Company. Terminal amine-containing polypivalolactone. 4,026,916, Cl. 260-471.00R.
Herubel, Jean Frederic, to N. Schlumberger & Cie. Winding-on flyer for a roving frame. 4,026,097, Cl. 57-117.000.
Hess, Richard William, to Du Pont de Nemours, E. I., and Company. Extended pigmentary $BiVO_4$ composition. 4,026,722, Cl. 106-288.00B.
Hess, Wolfgang; and Viebahn, Reiner, to Girling Limited. Brake pressure control valves for split braking systems. 4,026,607, Cl. 303-6.00C.
Heuber, Klaus; Klein, Wilfried; Najmann, Knut; Remshardt, Rolf; and Wiedmann, Siegfried K., to International Business Machines Corporation. Sense circuit for memory storage system. 4,027,176, Cl. 307-355.000.
Hewlett-Packard Company: *See—*
Brown, William W.; Hanson, Delon C.; and Hornak, Thomas, 4,027,152.
DeFevere, Dennis C.; and Solomon, Raymond, 4,026,240.
Hicks, Harry H. Adjustable door. 4,026,070, Cl. 49-55.000.
Higginbotham, James M., to Owens-Corning Fiberglas Corporation. Apparatus for making glass fibers. 4,026,689, Cl. 65-1.000.
Hilbig, Manfred: *See—*
Pfeiffer, Hartmut; Hilbig, Manfred; and Krella, Wolfgang, 4,026,154.
Hildreth, Edward C. Apparatus for removing immiscible solids and liquids from a liquid. 4,026,799, Cl. 210-84.000.
Hill, Ian Roland; Kenworthy, Raymond; and Porter, Philip, to N.V. Internationale Octrooi Maatschappij "Octropa". Rearing pigs. 4,027,011, Cl. 424-92.000.
Hill, Jack C.; and Bennett, David E., to Douglas Dynamics Corporation. Multiple circuit control. 4,026,048, Cl. 37-42.00R.
Hill, Kenneth O.; and Watanabe, Akira, to Canadian Patents and Development Limited. Frequency selective interwaveguide coupler. 4,026,632, Cl. 350-96.00C.
Hill-Rom Company, Inc.: *See—*
Adams, James S.; Peck, William H.; and Tekulve, Daniel R., 4,025,972.
Hilti Aktiengesellschaft: *See—*
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Hirahara, Keijiro: *See—*
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Hirakawa, Hiroshi: *See—*
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Kageyama, Kunio; Hirakawa, Hiroshi; Ozaki, Masatake; Sugiyama, Iwao; Iwakura, Mitsuharu; and Someya, Yoshiaki, 4,026,878.
Hirakawa, Seishiro; and Oniwa, Ryoji, to Mitsui Mining & Smelting Co., Ltd. Method for producing high purity lead. 4,026,776, Cl. 204-117.000.
Hirayama, Shin: *See—*
Tsuchida, Hiroshi; Sato, Makoto; and Hirayama, Shin, 4,026,644.
Hirschkoff, Sidney, to McCulloch Corporation. Snap-acting over-center chain saw safety brake and method of operation thereof. 4,026,392, Cl. 188-166.000.
Hitachi, Ltd.: *See—*
Inose, Fumiyuki; and Komatsu, Akio, 4,026,403.
Nomiya, Kosei; and Kikuchi, Tadao, 4,027,173.
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Hobart Corporation: *See—*
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Hobbs, Doreen Yvonne: *See—*
Ranby, Peter Whitten; and Hobbs, Doreen Yvonne, 4,026,816.
Hodge, Joel W. Newspaper support insert. 4,026,461, Cl. 232-17.000.
Hodgman, Gary Wesley: *See—*
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Hoechst Aktiengesellschaft: *See—*
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Rochlitz, Jurgen; and Lehner, Richard, 4,026,704.
Hoehn, Hans: *See—*
Denzel, Theodor; and Hoehn, Hans, 4,026,893.
Hoener, Ralph H., Jr., to H. H. Robertson Company. Window wall washing device for high rise buildings. 4,025,984, Cl. 15-302.000.
Hoffmann-La Roche Inc.: *See—*
Alig, Leo; Furst, Andor; and Muller, Marcel, 4,026,923.
Baggiolini, Enrico; Partridge, John Joseph, Jr.; and Uskokovic, Milan Radoje, 4,026,882.
Boguth, Walter; Leuenberger, Hans Georg Wilhelm; Mayer, Hans Johann; Widmer, Erich; and Zell, Reinhard, 4,026,949.
Chodnekar, Madhukar Subraya; Loeliger, Peter; Schwieter, Ulrich; Pfiffner, Albert; Suchy, Milos; and Zurfluh, Rene, 4,027,033.
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Lauer, Rudolph Frank; and Walser, Armin, 4,026,936.
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Holland, Charles L., to General Dynamics Corporation. Ultrasonic sensor assembly. 4,026,143, Cl. 73-67.50R.
Hollins, Jesse R. Motor vehicle equipment. 4,027,170, Cl. 307-10.00R.
Holm, Alan F. Folding bumper arrangement. 4,026,590, Cl. 293-73.000.
Holmes, Leo G., to United States of America, Army. Method of determining soy material in foods. 4,026,666, Cl. 23-230.00M.
Holmes, Warren B. Wall hanger. 4,026,510, Cl. 248-493.000.
Holt, Kenneth. Static mold vent. 4,026,512, Cl. 249-141.000.
Holtschmidt, Hans: *See—*
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Hope, Henry F.; and Hope, Stephen F. Conveyor apparatus for processing photographic materials. 4,026,451, Cl. 226-91.000.
Hope, Stephen F.: *See—*
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Hopfma Anstalt: *See—*
Schots, Klaas, 4,026,316.
Hoppner, Klaus; Landwehr, Gotz; Wilhelm, Adolf; Meyer, Wolfgang; Frers, Gerd; Lohberg, Rolf; Reiff, Dieter; Forderer, Karl; and Kosiollek, Helmut, to Andreas Stihl Maschinenfabrik. Guiding rail arresting device for motor driven saws. 4,026,020, Cl. 30-386.000.
Hori Glass Co., Ltd.: *See—*
Akabane, Morizi, 4,026,088.
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Hornak, Thomas: *See—*
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Horne, Charles G., Jr.; and Sobel, Martin, to Raylar Corporation. Rotary printing screen having heat-shrunk support members. 4,026,208, Cl. 101-116.000.
Hoshino, Yukio; Tsuiki, Hideo; Miyazaki, Toshio; and Miura, Tetsuo, to Nippon Electric Company, Ltd. Character recognizing system for machine-printed characters. 4,027,284, Cl. 340-146.3AQ.
Hosoda, Kazuo: *See—*
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Hosogai, Takeo: *See—*
Nishida, Takashi; Ninagawa, Yoichi; Itoi, Kazuo; Omura, Yoshiaki; Tamai, Yoshin; Hosogai, Takeo; and Fujita, Yoshiji, 4,026,960.
Howard, Norman Walter. Swing down closet. 4,026,434, Cl. 220-18.000.
Howard, Robert, to Gamex Industries Inc. Chip structure. 4,026,309, Cl. 133-8.00R.
Howell, Thomas H., to United States of America, Army. Thrust malalignment measurement apparatus. 4,026,147, Cl. 73-117.400.
Hoyt, Peter B.; and Schuyler, Stephen V. C., to Betco Block & Products, Inc. Brickwork form. 4,026,083, Cl. 52-387.000.
Hu, Joseph P.: *See—*
Isakson, Donald H.; Hu, Joseph P.; and Schaffer, Max A., 4,026,159.
Hubbard, Donald Arthur, to Imperial Chemical Industries Limited. Process for producing moulded expanded urea formaldehyde products. 4,026,980, Cl. 264-50.000.
Hubbell, Wayne C., to United States of America, Air Force. Surface wave augmented loop memory system. 4,027,299, Cl. 340-174.0TF.
Huber, Albert; and Hurliimann, Reinhard, to BBC Brown Boveri & Company Limited. Ventilation system for rotating water feeds. 4,026,315, Cl. 137-171.000.
Huber, Peter: *See—*
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Hubl, Julius; and Parzl, Franz, to Carl Hurth, Maschinen- und Zahnradfabrik. Control device for forward-reverse transmission gears. 4,026,396, Cl. 192-4.00A.
Huckins, James N.: *See—*
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Hudecek, Slavko: *See—*
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Huebner, George J.; and Whitfield, James H., to Chrysler Corporation. Method of manufacturing and operating a regenerator for gas turbine engine. 4,026,455, Cl. 228-118.000.
Huff, Jesse W.: *See—*
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Huffman, Allan M.; and Wowk, Anatole, to American Color & Chemical Corporation. Polyester fabric dyed with monoazo dyestuffs. 4,026,663, Cl. 8-41.00C.
Hughes Aircraft Company: *See—*
Kamath, G. Sanjiv; and Mitchell, Hollen P., 4,026,735.
Moyer, Norman E., 4,026,101.
Hughes, Donald Kent, to AMP Incorporated. Method and structure for terminating fine wires. 4,026,013, Cl. 29-628.000.
Hughes, James W.: *See—*
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Hultman, Dennis C.: *See—*
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Hultman, Robert H.; and Hultman, Dennis C. Underwater turbine operated by ocean currents. 4,026,587, Cl. 290-53.000.
Hunt, Roderick S. Dental syringe. 4,026,025, Cl. 32-22.000.
Hunter, Edwin J., to Toro Company, The. Sprinkler systems. 4,026,471, Cl. 239-206.000.
Huntington Alloys, Inc.: *See—*
Eiselstein, Herbert Louis; Clatworthy, Edward Frederick; and Smith, Darrell Franklin, Jr., 4,026,699.
Hurd, Claud C.: *See—*
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Hurley, James D., to General Electric Company. Pumped single-pass return liquid metal collector with reversed current path for acyclic machines. 4,027,184, Cl. 310-219.000.
Hurlimann, Reinhard: *See—*
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Hurst, Stanley Leonard, to National Research Development Corporation. Threshold logic gates. 4,027,175, Cl. 307-211.000.
Hurst, Thomas L., to A. E. Staley Manufacturing Company. Dry isomerase activation. 4,026,764, Cl. 195-31.00F.
Husqvarna AB: *See—*
Dygve, Hans G E; and Risman, Per Olov G, 4,027,133.
Hutchins, James P.; and Dobson, Robert D., to Procter & Gamble Company, The. Tampon having a mensesphilic foam treated with a liquid lubricant. 4,026,292, Cl. 128-285.000.
Hutson, Thomas, Jr., to Phillips Petroleum Company. Isoparaffin HF alkylation with low-boiling alkyl fluoride-containing fraction. 4,026,961, Cl. 260-683.490.
Hybrid Systems Corporation: *See—*
De Freitas, Richard E.; Mitchell, Peter W.; Tribeman, Peter D.; and Wilensky, Samuel, 4,027,101.
Hydril Company: *See—*
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Ichikawa, Shingo; Kashima, Yoshinobu; and Takamune, Hirotoki, to Citizen Watch Co., Ltd. Electronic timepiece with digital display means. 4,026,103, Cl. 58-50.00R.
Idemitsu, Kosan Kabushiki-Kaisha (Idemitsu Kosan Co., Ltd.): *See—*
Tomikawa, Masami; Tsunoda, Akiji; Ohkawa, Hideo; Kaneda, Kazuhisa; and Mugino, Yutaka, 4,026,841.
Iemura, Toshio: *See—*
Yamano, Masaru; and Iemura, Toshio, 4,027,194.
Igisu, Taro. Method for removing the strain of a substrate for an element of integrated circuit. 4,026,010, Cl. 29-625.000.
Iguchi, Masatoshi, to Agency of Industrial Science & Technology. Needle-like crystals of polyoxymethylene and method for manufacture thereof. 4,026,873, Cl. 260-67.0FP.
Iguchi, Susumu; and Furukawa, Masamichi, to Ricoh Co., Ltd. Shutter and low-light indicator actuating device for a camera. 4,027,314, Cl. 354-31.000.
Ihara, Satoru, to General Electric Company. Vacuum circuit breaker comprising series connected vacuum interrupters and capacitive voltage-distribution means. 4,027,123, Cl. 200-144.00B.
Iiyama, Masahiko; and Kamezaki, Takashi, to Honda Giken Kogyo Kabushiki Kaisha. Choke control system for internal combustion engine. 4,026,280, Cl. 123-119.00F.
Iizuka, Kinji: *See—*
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Ikeda, Tadayoshi, to Daicel, Ltd. Coating composition for acrylics. 4,026,720, Cl. 106-287.0SB.
Ikegami, Tadashi: *See—*
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Inata, Hiroo: *See—*
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Information Design Corporation of America: *See—*
Bown, Eric B.; Mueller, Harold P., III; and Robertson, Elton, 4,026,645.
Ing. C. Olivetti & C., S.p.A.: *See—*
Subrizi, Angelo; and Violino, Ettore, 4,027,290.
Ingenieursbureau Marcon (Marine Consultants) B. V.: *See—*
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Shiga, Shujiro; Katsumata, Takeshi; Inaba, Eiji; Okamoto, Yasushi; Inmaru, Atsushi; Nishioka, Tsugio; Nakata, Takashi; and Takaki, Seiji, 4,026,992.
Ino, Takao; Shimizu, Takeo; and Ono, Hiroaki, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Control device for regulating the amount of collected fuel and/or oil vapors which are delivered to the combustion chamber of an internal combustion. 4,026,258, Cl. 123-136.000.
Inose, Fumiyuki; and Komatsu, Akio, to Hitachi, Ltd. Automatic

printer with plurality of replaceable printing members. 4,026,403, Cl. 197-53.000.
Institut de Recherches de la Siderurgie Francaise (IRSID): *See*—
Birat, Jean Pierre; and Vedda, Louis, 4,026,346.
Insulin Injector Inc.: *See*—
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Owen, William H., III; Steele, Charles H. R.; and Pashley, Richard D., 4,026,733.
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International Business Machines Corporation: *See*—
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International Flavors & Fragrances Inc.: *See*—
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International Harvester Company: *See*—
Andersson, Ingemar R.; and Boetto, Charles, 4,026,365.
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Iowa State University Research Foundation, Inc.: *See*—
Larock, Richard Craig, 4,026,957.
Ipnar, Albert J.; and Brackbill, Warren H., to Sperry Rand Corporation. Spreading and distributing mechanism for a manure spreader. 4,026,476, Cl. 239-680.000.
Irikura, Tsutomu, to Kyorin Pharmaceutical Co., Ltd. Isoxazole derivatives. 4,026,902, Cl. 260-307.00H.
Isaacson, Milton S.: *See*—
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Isakson, Donald H.; Hu, Joseph P.; and Schaffer, Max A., to United Technologies Corporation. Fluidic angular rate sensor null error compensation. 4,026,159, Cl. 73-516.0LM.
Iseki, Shigeru; Morozumi, Mituharu; and Atsuta, Shoji, to Asahi Glass Co., Ltd. Fluorocarbon polymer composite containing a treated filler. 4,026,863, Cl. 260-42.140.
Ishigaki, Yukinobu: *See*—
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Ishigami, Toshihiko: *See*—
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Ishiguro, Tadashi: *See*—
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Ishiguro, Tatsuo, to Nippon Electric Company, Ltd. Code transmission system having buffers of approximately equal capacities on both transmitting and receiving sides. 4,027,100, Cl. 178-69.100.
Ishihara, Toshinobu: *See*—
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Shumaker, John F., 4,026,428.
J. T. Eaton Company: *See*—
Baker, Stanley Z., 4,026,064.
Jablecki, Charles K. Cutaneous sensitivity diagnostic device. 4,026,275, Cl. 128-2.00N.
Jacks, George J. Air current deflector for a towed trailer. 4,026,595, Cl. 296-1.00S.
Jackson, Andrew, to Mobil Oil Corporation. Traction drive. 4,026,166, Cl. 74-691.000.
Jackson, John Maxwell, to Cleamax Limited. Apparatus for cleaning inside and outside surfaces of containers. 4,026,311, Cl. 134-48.000.
Jackson, Richard R. Humidifier for air to be inhaled. 4,026,285, Cl. 128-192.000.
Jaclo, Inc.: *See*—
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Jacobs, Erwin; and Dorda, Gerhard, to Siemens Aktiengesellschaft. Static storage element and process for the production thereof. 4,027,320, Cl. 357-23.000.
Jacobs, Martin E., to United States of America, Energy Research and Development Administration. Eddy-current system for the vibration-testing of blades. 4,026,142, Cl. 73-67.400.
Jacobs, Martin E., to United States of America, Energy Research and Development Administration. Ionization detection system for aerosols. 4,027,165, Cl. 250-381.000.
Jacobs, Roland: *See*—
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Jaeger, Karl-Heinz; Kasparek, Hermann; and Herbrand, Willy, deceased (by Lauterbach, Elisabeth Herbrand nee, heir), to Solco Basel AG. Therapeutically effective N-substituted ureas. 4,026,942, Cl. 260-553.00R.
Jaeggi, Knut A.; Ostermayer, Franz; and Schroter, Herbert, to Ciba-Geigy Corporation. Pyridyloxyalkyleneamino-phenoxy-propanol-2-compounds. 4,027,027, Cl. 424-266.000.
Jahnke, Richard William, to Lubrizol Corporation, The. Adhesives prepared from alkaline reagents and polymers of water-soluble hydroxyalkylated and alkoxyalkylated compositions and the like derived from N-3-oxohydrocarbon-substituted acrylamides. 4,026,856, Cl. 260-29.40R.
James, Don E. Counterweighted bifold closures. 4,026,343, Cl. 160-189.000.
James, John Preston, to Phillips Petroleum Company. Method for catalytically cracking hydrocarbons. 4,026,789, Cl. 208-74.000.
James, Larry D. Quick threading magnetic tape reel. 4,026,489, Cl. 242-74.200.
James, Varnell L., to Boeing Company, The. Jet engine thrust reverser. 4,026,105, Cl. 60-226.00A.
Jania, Joseph M.: *See*—
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Jasny, Jan, to Centralne Laboratorium Optyki. Device to correct color. 4,026,650, Cl. 355-36.000.
Jauch, Jeremy P., to Westinghouse Electric Corporation. Solid state watt and var transducer. 4,027,241, Cl. 324-142.000.
Jelinek, Jerry G., to Parker-Hannifin Corporation. Sealed static joint and gasket therefor. 4,026,565, Cl. 277-180.000.
Jenkins, Harold F.: *See*—
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Jerman, Daniel L.: *See—*
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Jessogne, Harold James: *See—*
Kubacki, Edward Frank; Lemke, Harold Charles; Schmidt, George Alan; Gold, Vance Burton; and Jessogne, Harold James, 4,026,171.
Jessop, Quenton W., III. Aquariums. 4,026,243, Cl. 119-5.000.
Jeter, John Doise, to Texas Dynamatics, Inc. Methods and apparatus for transmitting information through a pipe string. 4,027,282, Cl. 340-18.0NC.
Jim Walter Corporation: *See—*
Albert, Frank D.; Conroy, Alan P.; and Skinner, David L., 4,026,478.
Jo Paul Industries, Inc.: *See—*
Paulson, John K.; Steffan, Walter J.; and Smith, Tommy L., 4,026,261.
Johansson, Karl Figge. Spice mill. 4,026,490, Cl. 241-169.100.
John Z. DeLorean Corporation: *See—*
DeLorean, John Z.; and Dirks, Chauncey L., 4,026,747.
Johns Hopkins University, The: *See—*
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Johnson, Alton J. Articulating dredge. 4,026,049, Cl. 37-67.000.
Johnson, Arthur E. Display case. 4,026,395, Cl. 190-16.000.
Johnson, Arthur J.: *See—*
Wolyn, Joseph; and Johnson, Arthur J., 4,025,999.
Johnson, Burnett H.; and Huff, Terrence, to Exxon Research and Engineering Company. Bromobutyl rubber-styrene-acrylonitrile graft copolymers. 4,026,968, Cl. 260-879.000.
Johnson, Fred J., to Container Corporation of America. Hollow wall display carton. 4,026,411, Cl. 206-45.190.
Johnson, George Arthur; Ewart, Martin Rodney; and Pethica, Brian Anthony, to Lever Brothers Company. Oxido-reductase in soap. 4,026,814, Cl. 252-132.000.
Johnson, James L.: *See—*
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Johnson, Marvin M.: *See—*
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Johnson, Richard C., to Xerox Corporation. Flash lamp modulator system. 4,027,199, Cl. 315-241.00R.
Johnson, Robert D.; and Altmann, Robert S., to NRG Nufuel Company; and Reserve Synthetic Fuels, Inc., a part interest to each. Method for testing and monitoring for producing landfill gas. 4,026,355, Cl. 166-246.000.
Joly, Jean Claud: *See—*
Dechelette, Helen; and Joly, Jean Claud, 4,026,629.
Jones, Allen Jacob, to Agnew, S. J. Fluid cooled dump grate. 4,026,247, Cl. 122-371.000.
Jones, Kenneth R., to Allis-Chalmers Corporation. Vertical crankshaft engine having longitudinally opposed cylinders. 4,026,377, Cl. 180-64.00R.
Jones, Peter Hadley: *See—*
Winn, Martin; Kyncl, Jaroslav; Dunnigan, Daniel Ambrose; and Jones, Peter Hadley, 4,026,894.
Jones, Richard C. Roof-gravel removal apparatus. 4,026,441, Cl. 222-609.000.
Jones, Thomas M., to ACF Industries, Incorporated. Seat extractor tool for extracting valve seats. 4,026,001, Cl. 29-213.00E.
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Jorro, Michael Anthony Ambrose; Rantell, Terry Dean; and Tosswill, Diana Louise, to Coal Industry (Patents) Limited. Carbon artefacts. 4,026,998, Cl. 423-445.000.
Joseph, John Abraham. Conveyor sampler. 4,026,155, Cl. 73-423.00R.
Joseph Skilken & Co.: *See—*
Richardson, Orland W., 4,026,573.
Joslyn, John: *See—*
Luchsinger, Charles R.; and Joslyn, John, 4,026,531.
Jouffret, Michel: *See—*
Costantini, Michel; Dromard, Adrien; and Jouffret, Michel, 4,026,947.
Judd, George G.: *See—*
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Jukhimets, Anatoly Konstantinovich: *See—*
Fedotkin, Igor Mikhailovich; Jukhimets, Anatoly Konstantinovich; and Odery, Leonid Panteleimonovich, 4,027,045.
Kabasakalian, Peter; Kalliney, Sami Y.; Ganguly, Ashit K.; and Westcott, Anita, to Schering Corporation. Everninomicin antibacterial derivatives, electrochemical method for their manufacture, method for their use as antibacterial agents, and pharmaceutical compositions useful therefor. 4,027,016, Cl. 424-180.000.
Kabushiki Kaisha Hokushin Denki Seisakusho: *See—*
Tsuchida, Hiroshi; Sato, Makoto; and Hirayama, Shin, 4,026,644.
Kabushiki Kaisha Kawamura Saikuru: *See—*
Omori, Hisashi, 4,026,546.
Kabushiki Kaisha Komatsu Seisakusho: *See—*
Motomura, Mitsuteru; Kojima, Chiaki; Ohta, Hiroshi; and Nemoto, Akira, 4,026,604.
Takada, Hiroshi; and Kawada, Yasuo, 4,026,371.
Kabushiki Kaisha Suwa Seikosha: *See—*
Yamazaki, Yoshio, 4,026,637.
K.K. Uchida Sangyo: *See—*
Uchida, Hiroshi, 4,026,194.
Kach, Alfred, to Patelhold Patentverwertungs- und Elektro-Holding AG. Fibre network having a passive optical coupling element for optoelectronic transmission of data between addressable subscriber stations. 4,027,153, Cl. 250-199.000.
Kachi, Atsuyuki: *See—*
Satoh, Akihiro; Konotsune, Shiro; Kachi, Atsuyuki; and Shimizu, Hiroshi, 4,027,087.
Kadatz, Rudolf: *See—*
Austel, Volkhard; Kutter, Eberhard; Heider, Joachim; Eberlein, Wolfgang; Kadatz, Rudolf; and Diederen, Willi, 4,026,891.
Kaetsu, Isao: *See—*
Yoshida, Masaru; and Kaetsu, Isao, 4,026,826.
Kagawa, Hiroshi: *See—*
Nakabayashi, Takashi; and Kagawa, Hiroshi, 4,027,075.
Kageyama, Kunio; Hirakawa, Hiroshi; Ozaki, Masatake; Sugiyama, Iwao; Iwakura, Mitsuharu; and Someya, Yoshiaki, to Yokohama Rubber Co. Ltd., The. Vulcanization accelerator system for rubber compositions. 4,026,877, Cl. 260-79.50P.
Kageyama, Kunio; Hirakawa, Hiroshi; Ozaki, Masatake; Sugiyama, Iwao; Iwakura, Mitsuharu; and Someya, Yoshiaki, to Yokohama Rubber Co. Ltd., The. Vulcanization accelerator system for rubber compositions. 4,026,878, Cl. 260-79.50P.
Kahlbrock, Heinz, to Bell Telephone Laboratories, Incorporated. Echo prevention circuit. 4,027,114, Cl. 179-170.200.
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Kahoe Laboratories, Inc.: *See—*
Kahoe, H. Taylor; Coultas, George E.; and Skipworth, Dana W., 4,026,321.
Kaim, German Abramovich: *See—*
Kaluzhsky, Nikolai Andreevich; Rubinchik, Faitel Markovich; Nasyrov, Gakif Zakirovich; Kaim, German Abramovich; Averin, Vitaly Mikhailovich; Milrud, Savely Mikhailovich; Telyatnikov, Garry Vladimirovich; Lyakhov, Viktor Prokhorovich; Abramova, Ljudmila Nikolaevna; Tarasov, Vladimir Ivanovich; Denisov, Vladislav Mikhailovich; Nasyrov, Dinam Latypovich; Stolyar, Boris Alexandrovich; Tagiev, Muzafar Suleiman-ogly; Lagno, Vladimir Ivanovich; and Kostin, Vladimir Nikolaevich, 4,026,672.
Kainuma, Hiroyuki: *See—*
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Kaiser Aluminum & Chemical Corporation: *See—*
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Kaiser, Arthur; Mahler, Henry W.; and McMann, Renville H., Jr., to CBS Inc. Multiplex color television transmission system. 4,027,333, Cl. 358-146.000.
Kaiser, Henry William: *See—*
Carnes, James Edward; Dawson, Robert Herman; Fedorka, Robert Thomas; and Kaiser, Henry William, 4,027,260.
Kakeya, Nobuharu: *See—*
Sugimoto, Keiichi; Nishijima, Koji; Akimoto, Hiroshi; Hanaoka, Tadashi; and Kakeya, Nobuharu, 4,026,940.
Kalamazoo Conveyor Company: *See—*
Becker, Roger T., 4,026,408.
Kalbfleisch, Herbert L.: *See—*
Orth, George Otto, Jr., 4,026,792.
Kallfass, Herbert; Rasp, Christian; and Schliebs, Reinhard, to Bayer Aktiengesellschaft. Method for preventing corrosion in water-carrying systems. 4,026,815, Cl. 252-180.000.
Kalliney, Sami Y.: *See—*
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Kaluzhsky, Nikolai Andreevich; Rubinchik, Faitel Markovich; Nasyrov, Gakif Zakirovich; Kaim, German Abramovich; Averin, Vitaly Mikhailovich; Milrud, Savely Mikhailovich; Telyatnikov, Garry Vladimirovich; Lyakhov, Viktor Prokhorovich; Abramova, Ljudmila Nikolaevna; Tarasov, Vladimir Ivanovich; Denisov, Vladislav Mikhailovich; Nasyrov, Dinam Latypovich; Stolyar, Boris Alexandrovich; Tagiev, Muzafar Suleiman-ogly; Lagno, Vladimir Ivanovich; and Kostin, Vladimir Nikolaevich. Plant for fluidized bed heat treatment of powdered alunite. 4,026,672, Cl. 23-262.000.
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Kameyama, Teruhiko: *See—*
Kishida, Hideaki; Fukuoka, Hiroshi; and Kameyama, Teruhiko, 4,027,095.
Kamezaki, Takashi: *See—*
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Kamijo, Tetsuhide: *See—*
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Kanayama, Kazunori: *See—*
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Kanebo, Ltd.: *See—*
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Kaneda, Kazuhisa: *See—*
Tomikawa, Masami; Tsunoda, Akiji; Ohkawa, Hideo; Kaneda, Kazuhisa; and Mugino, Yutaka, 4,026,841.
Kaneda, Makoto, to Tokyo Denshi Kabushiki Kaisha. Automatic repeat system for magnetic tape recorders and reproducers. 4,026,496, Cl. 242-191.000.

Kaneda, Saburo: *See—*
Tokura, Koichi; and Kaneda, Saburo, 4,027,291.

Kanno, Tadaaki; and Kobayashi, Yuichi, to Ricoh Co., Ltd. Copy sheet feed device. 4,026,647, Cl. 355-8.000.

Kannowade, Heinz, to Licentia Patent-Verwaltungs G.m.b.H. Control system to re-establish the orthogonality of two cross-coupled orthogonally polarized transmitted signals. 4,027,105, Cl. 179-15.08C.

Kantelberg, Adrianus Hubertus: *See—*
Van Alphen, Willem Meijndert; Barten, Piet Gerard Joseph; Van Den Boogert, Johannes; Nieuwendijk, Joris Adelbert Maria; Gerritsen, Jan; and Kantelberg, Adrianus Hubertus, 4,027,219.

Kaplan, Murray A.; Gottstein, William J.; and Granatek, Alphonse P., to Bristol-Myers Company. Certain derivatives of particular 3-thiolated cephalosporins. 4,026,888, Cl. 260-243.00C.

Karkoska, George E., to G.E.K. Enterprises, Inc. Football goal posts with message matrix. 4,026,554, Cl. 273-55.00R.

Karnet, Nikolai Sergeevich: *See—*
Bortkevich, Leonid Leonidovich; Burmistrov, Alexandr Georgievich; Karnet, Nikolai Sergeevich; Sevostyanov, Boris Alexandrovich; and Filatova, Tatyana Grigorievna, 4,025,987.

Kartridg Pak Co., The: *See—*
Rousseau, Roy Settle, 4,025,985.

Kasatkin, Alexei Fedoseevich; and Feldman, Ilya Afanasievich. Ribbon loudspeaker. 4,027,111, Cl. 179-115.00V.

Kashima, Yoshinobu: *See—*
Ichikawa, Shingo; Kashima, Yoshinobu; and Takamune, Hirotoki, 4,026,103.

Kasparek, Hermann: *See—*
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Kauffman, Robert N.: *See—*
Smith, James D. B.; and Kauffman, Robert N., 4,026,862.

Kavera, Alexandr Alexandrovich; Nitkovskikh, Anatoly Anatolievich; Leontenko, Anatoly Fedorovich; and Gaidar, Igor Longinovich. Continuous action mixing apparatus for bulk materials. 4,026,530, Cl. 259-9.000.

Kawada, Yasuo: *See—*
Takada, Hiroshi; and Kawada, Yasuo, 4,026,371.

Kawakami, Shinji: *See—*
Toyokuni, Kazuo; Yamada, Shunzo; Takahashi, Teizo; Nakamura, Hajime; Nobutomo, Kazunari; and Kawakami, Shinji, 4,026,124.

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Kawamoto, Hirohisa; and Miller, David Joseph, III, to RCA Corporation. High repetition rate injection laser modulator. 4,027,179, Cl. 307-296.00R.

Kawamoto Industrial Co., Limited: *See—*
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Kawasaki Jukogyo Kabushiki Kaisha: *See—*
Ueda, Kazuo; Arima, Takao; and Kanayama, Kazunori, 4,026,660.

Kawase, Shigeru: *See—*
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Keating, Richard T. Auto crumb remover. 4,026,804, Cl. 210-167.000.

Keernig, Wolfgang: *See—*
Fischer, Roman; Fliege, Werner; Keernig, Wolfgang; and Horn, Peter, 4,026,952.

Keil, Walter: *See—*
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Furst, Andor; Muller, Marcel; Alig, Leo; Keller, Peter; Kerb, Ulrich; Wiechert, Rudolf; Kieslich, Klaus; and Petzoldt, Karl, 4,026,921.

Keller, Ray V., to Ventures Unlimited Corporation. Apparatus for preparing electronic component wire leads preliminary to mounting the components on circuit boards. 4,026,333, Cl. 140-105.000.

Keller, Wolfgang: *See—*
Reuschel, Konrad; Schnoeller, Manfred; Muehlbauer, Alfred; Spenke, Eberhard; and Keller, Wolfgang, 4,027,051.

Kellwood Company: *See—*
Engelbrecht, John W.; and Lockard, John C., 4,027,062.

Kelly, Gilbert H.: *See—*
Bedenbender, John W.; and Kelly, Gilbert H., 4,026,383.

Kemme, Herbert Rudolph; and Russ, James Frederick, to American Cyanamid Company. Low temperature isomerization process for isopropylnaphthalene (100 percent sieve catalyst). 4,026,959, Cl. 260-668.00A.

Kempton, Marvin L., to United States of America, Navy. Selectively aimable warhead. 4,026,213, Cl. 102-56.0SC.

Kendall, John Anthony: *See—*
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Kennecott Copper Corporation: *See—*
Ammann, Paul R.; Cook, Glenn M.; and Portal, Charles, 4,026,772.
Wells, Barry A.; and Clark, Don Richard, 4,026,988.

Kennedy, Alexander W., to Diamond Shamrock Corporation. Preparation of zinc flake coating composition. 4,026,710, Cl. 106-1.000.

Kennedy, Harold, Jr.; and Graham, Robert M., to United States Pipe and Foundry Company. Plain end pipe joint. 4,026,586, Cl. 285-236.000.

Kennedy, Kenneth W., to United States of America, Air Force. Two-dimensional drawing board manikin. 4,026,041, Cl. 35-26.000.

Kennedy, Othar P., Jr.: *See—*
Dill, John L., III; and Kennedy, Othar P., Jr., 4,026,601.

Kenny, Thomas M., to Ogontz Controls Company, Inc. Temperature-sensitive snap-action valve. 4,026,465, Cl. 236-48.00R.

Kenworthy, Raymond: *See—*
Hill, Ian Roland; Kenworthy, Raymond; and Porter, Philip, 4,027,011.

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Alig, Leo; Furst, Andor; Muller, Marcel; Kerb, Ulrich; and Wiechert, Rudolf, 4,026,922.
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Kern, Jack L., to Xerox Corporation. Ribbon tension control means. 4,026,492, Cl. 242-75.200.

Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung: *See—*
Pollermann, Max, 4,027,167.

Kerns, Cordon R., to United States of America, Energy Research and Development Administration. Current level detector. 4,027,239, Cl. 324-118.000.

Kerr, Howard S.: *See—*
Driffield, John B.; Kerr, Howard S.; Penrose, Richard M.; and Stonell, Anthony C., 4,027,160.

Kesling, Peter C. Holder for orthodontic tying attachment. 4,026,021, Cl. 32-14.00A.

Kessler, Alan B.: *See—*
Dugger, Elizabeth L.; and Kessler, Alan B., 4,026,131.

Kessler, Milton. Clothes hanger. 4,026,446, Cl. 223-88.000.

Kevin, Ernest W. Apparatus and method for carrying articles on a tennis racquet. 4,026,449, Cl. 224-45.00L.

Keystone Industries, Inc.: *See—*
Hawthorne, Vaughn T., 4,026,418.

Khrapova, Evgenia Vladimirovna: *See—*
Gryaznov, Vladimir Mikhailovich; Polyakova, Viktoria Petrovna; Savitsky, Evgeny Mikhailovich; and Khrapova, Evgenia Vladimirovna, 4,026,958.

Kibbish, Frank M., to Optical Coating Laboratory, Inc. Ingot gripper assembly. 4,027,093, Cl. 13-31.000.

Kientz, Robert B.: *See—*
Byberg, Bjarne I.; and Kientz, Robert B., 4,026,018.

Kieslich, Klaus: *See—*
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Kikuchi, Tadao: *See—*
Nomiya, Kosei; and Kikuchi, Tadao, 4,027,173.

Kim, Yung K.; Lee, Chi-Long; and Ronk, Gary M., to Dow Corning Corporation. Method of reducing the foam density of silicone foams and compositions. 4,026,845, Cl. 260-2.50S.

Kimberly-Clark Corporation: *See—*
Ales, Thomas M., Jr., 4,026,487.

Kimura, Hiromasa, to Sony Corporation. Amplifier. 4,027,272, Cl. 330-30.00D.

Kindig, Alan L.; and Brown, Ronald H., to General Electric Company. Apparatus and methods for aligning and placing insulating members in magnetic core slots. 4,026,009, Cl. 29-596.000.

King, David Campbell; and Kendall, John Anthony, to Du Pont of Canada Limited. Injection valve. 4,026,324, Cl. 137-605.000.

King, James P.: *See—*
Gillman, Hyman D.; and King, James P., 4,026,830.

Kinoshita, Yukihiko: *See—*
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Kintigh, Stanley S.: *See—*
Larsen, Theodore E.; and Kintigh, Stanley S., 4,027,164.

Kirschner, Wallace; and Haskel, Lawrence Martin, to Alpex Computer Corporation. Television display control apparatus. 4,026,555, Cl. 273-85.00R.

Kiselev, Anatoly Efimovich; Skurkovich, Semen Vladimirovich; Golosova, Tatyana Vasilievna; From, Anatoly Alexandrovich; Papko, Grigory Fedoseevich; Shenkman, Ljudmila Semenovna; and Anikina, Tatyana Pavlovna. Antistaphylococcous human immunoglobulin and method of preparing same. 4,027,010, Cl. 424-87.000.

Kishida, Hideaki; Fukuoka, Hiroshi; and Kameyama, Teruhiko, to Nisshin Steel Co., Ltd.; and Matsuzaka Company. Hermetically sealed arc furnace. 4,027,095, Cl. 13-9.00R.

Kishimoto, Ichimatsu: *See*—
Yamachika, Kenzabro; Sonoda, Ituro; Kishimoto, Ichimatsu; and Matsushima, Masaaki, 4,026,384.

Kishimoto, Juji, to Canon Kabushiki Kaisha. System for driving liquid crystal display device. 4,027,305, Cl. 340-336.000.

Kishino, Shigeo; Kudamatsu, Akio; and Shiokawa, Kozo, to Bayer Aktiengesellschaft. Combatting pests with O-ethyl-S-n-propyl-O-(substituted phenyl)-phosphorothiolates. 4,027,018, Cl. 424-210.000.

Kissei Yakuhin Kogyo Kabushiki Kaisha (Kissei Pharmaceutical Co. Ltd.): *See*—
Harita, Kozaburo; Ajisawa, Yukiyoshi; Iizuka, Kinji; Toda, Michio; Kinoshita, Yukihiko; Kamijo, Tetsuhide; and Kobayashi, Michihiro, 4,026,896.

Kittle, Ronald E., to Dow Corning Corporation. Foamable silicone gum stock having less skin thickness. 4,026,843, Cl. 260-2.50S.

Kittle, Ronald E.; and Ronk, Gary M., to Dow Corning Corporation. Method of foaming a siloxane composition using microwave energy. 4,026,844, Cl. 260-2.50S.

Kittle, Ronald E.; and Polmanteer, Keith E., to Dow Corning Corporation. Silicone rubber sponge composition, method of making the sponge. 4,026,846, Cl. 260-2.50S.

Klaiber, Erigh Manfred: *See*—
Pittet, Alan Owen; Klaiber, Erigh Manfred; Vock, Manfred Hugo; Shuster, Edward J.; and Vinals, Joaquin, 4,026,824.

Kleimenhagen, Karl L.; and Sommars, Mark F., to Caterpillar Tractor Co. Speed sensitive fuel control system. 4,026,260, Cl. 123-140.00R.

Klein, Howard P.: *See*—
Zimmerman, Robert L.; McEntire, Edward E.; and Klein, Howard P., 4,026,836.

Klein, Wilfried: *See*—
Heuber, Klaus; Klein, Wilfried; Najmann, Knut; Remshardt, Rolf; and Wiedmann, Siegfried K., 4,027,176.

Klenk, Emil, to Maschinenbau Oppenweiler GmbH. Continuous feeder. 4,026,550, Cl. 271-151.000.

Klepper, Herbert; Hansen, Walter; Harris, Joel S.; and Golesorkhi, Farrokh, to Eltra Corporation. Photocomposing machine and font strip therefor for kerned characters. 4,027,313, Cl. 35415-.

Klimo, Robert G., to Cleveland Machine Controls, Inc. Field shunting circuit. 4,027,214, Cl. 318-139.000.

Kline, Charles M.; and Waldrop, Thomas W., to Sperry Rand Corporation. Feed material mixing apparatus. 4,026,528, Cl. 259-7.000.

Kline, Charles M.; and Waldrop, Thomas W., to Sperry Rand Corporation. Feed material mixing apparatus. 4,026,529, Cl. 259-7.000.

Kluge, Johannes: *See*—
Messerschmidt, Dieter; Kluge, Johannes; and Schleyer, Meinolf, 4,026,526.

Klusmann, Eugene B.: *See*—
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Klykon, Inc.: *See*—
Finger, Richard H., 4,026,684.

Knapp, Paul A. Stabilizing foot apparatus for camera. 4,027,318, Cl. 354-293.000.

Knapp, Randolph H.; and Richardson, Edwin A., to Shell Oil Company. Treating wells with a temporarily thickening cellulose ether solution. 4,026,361, Cl. 166-281.000.

Knauer, Ralph H.; and Rohrbach, William R., to Western Electric Company, Inc. Venturi nozzle for air guns. 4,026,474, Cl. 239-430.000.

Kneisley, Joel D.: *See*—
Purcupile, John Charles; Lenden, Angela L.; Mutschler, Thomas A.; Kneisley, Joel D.; Wieszczyk, Mark P.; Lasser, Ronald; and Fulmer, Donald W., 4,026,116.

Knight, John H.; and Isaacson, Milton S., to Xerox Corporation. Rotary machine. 4,027,215, Cl. 318-341.000.

Knipe, Richard L.: *See*—
Russell, Edward A.; Knipe, Richard L.; and Leaver, James E., 4,026,775.

Knoche, Karl-Friedrich; Cremer, Helmut; and Steinborn, Gerhard. Production of iron (II) chloride and chlorine from ferric chloride. 4,026,999, Cl. 423-493.000.

Knoll, Jozsef; Furst, Zsuzsanna; Meszaros, Zoltan; Szentmiklosi, Peter; David, Agoston; Hermecz, Istvan; Mandi, Attila; Bognar, Rezso; Makleit, Sandor; Valovics, Gyula; Szavik, Laszlo; and Nagy, Sandor, to Chinoin Gyogyszer-es Vegyeszeti Termekek Gyara RT. Pharmaceutical composition having synergistic analgesic activity. 4,027,024, Cl. 424-251.000.

Knollenberg, Robert G., to Particle Measuring Systems, Inc. Method and apparatus for orienting and measuring fibrous particles. 4,027,162, Cl. 250-345.000.

Knoops, Theodorus, to Oce-van der Grinten N.V. Control system of a sorting device. 4,026,539, Cl. 271-173.000.

Knorr-Bremse GmbH: *See*—
Gebhardt, Hans; Prahl, Franz; Popescu, Corneliu Mircea; and Schorwerth, Mathias, 4,026,393.

Knox, Howard T.: *See*—
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Knusting, Gregor; and Ahrens, Karl-Heinrich, to Wilhelm Stoll Maschinenfabrik GmbH. Hay-raking machine. 4,026,093, Cl. 56-370.000.

Kobaru, Seikichi: *See*—
Tomita, Koji; Kobaru, Seikichi; Hanada, Minoru; and Tsukiura, Hiroshi, 4,026,766.

Kobatake, Takashi; Takeda, Kyosuke; Nishide, Sadao; and Saito, Tetsuo, to Asahi Kasei Kogyo Kabushiki Kaisha. Variable passage type yarn guide arrangement. 4,026,095, Cl. 57-34.500.

Kobayashi, Atsuto: *See*—
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Kobayashi, Herbert S.; and Bradfield, Sydney P., III, to United States of America, National Aeronautics and Space Administration. Unbalanced quadriphase demodulator. 4,027,265, Cl. 329-122.000.

Kobayashi, Keiji. Infant's teether toy. 4,026,297, Cl. 128-359.000.

Kobayashi, Michihiro: *See*—
Harita, Kozaburo; Ajisawa, Yukiyoshi; Iizuka, Kinji; Toda, Michio; Kinoshita, Yukihiko; Kamijo, Tetsuhide; and Kobayashi, Michihiro, 4,026,896.

Kobayashi, Nobuyuki, to Toyota Jidosha Kogyo Kabushiki Kaisha. Exhaust gas purification system. 4,026,168, Cl. 74-860.000.

Kobayashi, Takayuki: *See*—
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Kobayashi, Yuichi: *See*—
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Koehler, Albert M.: *See*—
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Koike, Syouichi, to Nissan Motor Co., Ltd. Weather strip for motor vehicle door and seal construction. 4,026,598, Cl. 296-146.000.

Kojima, Chiaki: *See*—
Motomura, Mitsuteru; Kojima, Chiaki; Ohta, Hiroshi; and Nemoto, Akira, 4,026,604.

Kokal, August, Jr. Dental hand drill employing pressure-sensitive grip. 4,026,027, Cl. 32-26.000.

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Koninklijke Fabrieken Penn & Baudin B. V.: *See*—
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Konishiroku Photo Industry Co., Ltd.: *See*—
Nakamura, Shinichi; Ishikawa, Hidehiko; Mogaki, Katsuo; Sato, Mikio; Sato, Shui; Taguchi, Masahiko; and Sato, Haruhiko, 4,026,706.
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Konotsune, Shiro: *See*—
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Kools, Franciscus Xaverius Nicolaus Maria, to U.S. Philips Corporation. Radially anisotropic magnet body. 4,026,975, Cl. 264-24.000.

Koons, Russell E., to Lion Oil Company. Asphalt-based compositions. 4,027,059, Cl. 428-36.000.

Korba, Michael A. Timing light adaptor. 4,026,621, Cl. 339-26.000.

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Kosiollek, Helmut: *See*—
Hoppner, Klaus; Landwehr, Gotz; Wilhelm, Adolf; Meyer, Wolfgang; Frers, Gerd; Lohberg, Rolf; Reiff, Dieter; Forderer, Karl; and Kosiollek, Helmut, 4,026,020.

Kostin, Vladimir Nikolaevich: *See*—
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Kosuge, Kazuhiko: *See*—
Hayashi, Yoshiki; Hasegawa, Masanaru; Fusayama, Takeo; Kosuge, Kazuhiko; and Hayashi, Kenji, 4,026,703.

Koump, Valentin, to Urban Reclamation Technologies, Inc. Removal of tin from molten iron by chlorination, using oxygen to conserve chlorine and to produce tin oxide. 4,026,698, Cl. 75-59.000.

Koval, Vladimir Vasilievich: *See*—
Shmakov, Eduard Ivanovich; Medovar, Boris Izrailevich; Chvertko, Anatoly Ivanovich; Koval, Vladimir Vasilievich; Fedotenkov, Vyacheslav Georgievich; Bondarenko, Oleg Petrovich; Kravchuk, Anatoly Iosifovich; Marchenko, Alexandr Mikhailovich; and Bogachenko, Alexei Georgievich, 4,027,233.

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Krepler, Albert: *See—*
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Kress, Edward S. Scrap box carrier. 4,026,430, Cl. 214-313.000.

Kressner, Michael: *See—*
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Kril, Russell Stephen, to Burroughs Corporation. Transducer positioning system for providing coarse positioning. 4,027,338, Cl. 360-77.000.

Krivit, Lawrence R. Dental floss holder. 4,026,308, Cl. 132-91.000.

Kroll, Wolfram Rainer: *See—*
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Kubacki, Edward Frank; Lemke, Harold Charles; Schmidt, George Alan; Gold, Vance Burton; and Jessogne, Harold James, to American Can Company. Shuttle transfer mechanism. 4,026,171, Cl. 82-102.000.

Kubotera, Haruo: *See—*
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Kuboto Tekko Kabushiki Kaisha: *See—*
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Kuehl, Wilbert F. Combination cabinet and roll out drawer cart. 4,026,616, Cl. 312-250.000.

Kuehnle, Manfred R., to Coulter Information Systems, Inc. Thin film deposition apparatus using segmented target means. 4,026,787, Cl. 204-298.000.

Kuever, Hazel J., surviving spouse: *See—*
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Kuever, Paul H., deceased; and Kuever, Hazel J., surviving spouse. Drafting template. 4,026,030, Cl. 33-174.00B.

Kuhn, Edgar D.; Lathrop, Leonard E.; and Sanderson, Robert J., to Primore Sales, Inc. Refrigeration system. 4,026,122, Cl. 62-196.00C.

Kuhnle, Willi; Wendler, Heinz; Glaser, Manfred; and Breisch, Harald, to Zahnradfabrik Friedrichshafen AG. Electro-hydraulic control system for speed-changing mechanism switchable under load. 4,026,169, Cl. 74-861.000.

Kuhnlein, Leo: *See—*
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Kume, Kazunari; Watanabe, Minoru; Oono, Hideshi; and Tamaru, Munetaka, to Citizen Watch Co., Ltd. Timepiece with calendar mechanism. 4,026,100, Cl. 58-4.00R.

Kummer, Franz; Mai, Gerhard; Ruthardt, Rolf; and Thiede, Horst, to W. C. Heraeus GmbH. Metallic support carrier for semiconductor elements. 4,027,326, Cl. 357-67.000.

Kumpulainen, Kauko. Connecting device. 4,026,594, Cl. 294-83.00R.

Kumysh, Ilya Iosifovich: *See—*
Medovar, Boris Izrailevich; Kumysh, Ilya Iosifovich; Boiko, Georgy Alexandrovich; Grodzitsky, Stanislav Vitalievich; Arkhipov, Nikolai Vasilievich; and Skoropupov, Anatoly Nikolaevich, 4,027,092.

Kuno, Akira; Shinoda, Yoshio; and Arai, Hiroshi, to Nippon Soken, Inc.; and Toyota Jidosha Kogyo Kabushiki Kaisha. Fuel consumption measuring device. 4,026,146, Cl. 73-113.000.

Kuntz, Urban E.: *See—*
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Kunugi, Takashi: *See—*
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Kuroda, Susumu, to Kawamoto Industrial Co., Limited. Method of, and apparatus for sizing and drying warps. 4,025,993, Cl. 28-28.000.

Kuron, Gunther W.: *See—*
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Kurrle, Frederick L., to Westvaco Corporation. Composite silicate pigment. 4,026,721, Cl. 106-288.00B.

Kusz, Maximillian; and Lovalenti, Sam, to Owens-Illinois, Inc. Stone detector. 4,026,656, Cl. 356-51.000.

Kutaguchi, Katuhiko, to Taihei Kogyo Co., Ltd. Plastic saddle for bicycle. 4,026,600, Cl. 297-214.000.

Kutsykovich, Dorina Borisovna: *See—*
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Lacrex Brevetti S.A.: *See—*
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Ladin, Eli M., to Federal-Mogul Corporation. Self-aligning thrust bearing assembly. 4,026,399, Cl. 192-98.000.

Laferty, John M.: *See—*
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Lalonde, Michel; and Stoller, Hansjorg, to Hoffmann-La Roche Inc. Photochemical isomerization of vitamin A compounds. 4,026,778, Cl. 204-159.000.

Lam, Robert: *See—*
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Lamberti, Vincent; and Gutierrez, Eddie N., to Lever Brothers Company. Monoalkyl-para-dioxanes. 4,026,813, Cl. 252-89.00R.

Lambla, Morand; and Terrisse, Jean, to Agence Nationale de Valorisation de la Recherche (ANVAR). Dispersion-polymerization process using block copolymers. 4,026,962, Cl. 260-827.000.

Lampietti, Bernard Pierre: *See—*
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Lang, Gordon R. Apparatus and method for reducing effects of amplitude and phase jitter. 4,027,250, Cl. 325-323.000.

Lang, Walter: *See—*
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Langere, Ronald Francis; Loeffler, Otto Ernest; and Santini, Thomas Francis, to N L Industries, Inc. Production of hydrous pentavalent

antimony oxide sol composition, dry powder prepared therefrom, and production of said dry powder. 4,026,819, Cl. 252-313.00R.
Langley, David T. Building brick. 4,026,086, Cl. 52-582.000.
Lapke, Robert A.; and Richards, Bernard G., to Caterpillar Tractor Co. Oil cooled piston rings. 4,026,197, Cl. 92-186.000.
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Larner, Douglas Stanley, to Plessey Handel und Investments A.G. Circuit for generating synchronization signals. 4,027,178, Cl. 307-269.000.
Larock, Richard Craig, to Iowa State University Research Foundation, Inc. Symmetrical conjugated diene and polyene synthesis via vinylmercuric salts. 4,026,957, Cl. 260-666.00A.
Larrea, Carlos Ayesta. Rotary cycloidal continuous toroidal chamber internal combustion engine. 4,026,249, Cl. 123-8.470.
Larsen, Larry Donald, to International Business Machines Corporation. Method of decoding data content of F2F and phase shift encoded data streams. 4,027,267, Cl. 329-106.000.
Larsen, Richard J.: *See*—
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Larson, Charles W. Baseball pitcher's practice target. 4,026,551, Cl. 273-26.00A.
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Laurent, Pierre; and Milosevic, Ljubimko, to Thomson-CSF. Synchronization extractor. 4,027,261, Cl. 328-63.000.
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Law, Arthur Duerden. Paper reel stands. 4,026,486, Cl. 242-58.600.
Lawrence, Frederick J. Selective tray sheet sorting machine. 4,026,540, Cl. 271-173.000.
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Lea, James M.; and Anderson, Neil P. Air mattress and method of making the same. 4,025,974, Cl. 5-367.000.
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LeBrun, Paul Antony Hammet; and Backhurst, Nigel Gordon. Board game apparatus. 4,026,557, Cl. 273-134.00D.
Leclere, Ralph Joseph, to International Business Machines Corporation. Document article handling control. 4,026,543, Cl. 271-259.000.
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Lee, Chi-Long; and Ronk, Gary M., to Dow Corning Corporation. Method of preparing fire retardant open-cell siloxane foams and foams prepared therefrom. 4,026,842, Cl. 260-2.50S.
Lee, Chi-Long: *See*—
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Lee, Lawrence Y., to L. H. Research. Electronic cooling chassis. 4,027,206, Cl. 361-384.000.
Lee, Wenpo, to Volkswagenwerk Aktiengesellschaft. Arrangement for stabilization of flow in a reaction carburetor. 4,026,248, Cl. 123-3.000.
Lee, Yuan Ho. Feeding device for multi-headed radial type nut tappers. 4,025,978, Cl. 10-130.0WH.
Leenaards, Antoine Joseph, to Crown Cork & Seal Company, Inc. Palletizing apparatus with means for forming layer of articles. 4,026,422, Cl. 214-6.00P.
Leenhouts, Albert C., to Superior Electric Company, The. Manual control in a motion control system. 4,027,222, Cl. 318-591.000.
Lees, David Logan; and Wild, Colin Alfred, to Scapa-Porritt Limited. Jointing of fabric ends to form an endless structure. 4,026,331, Cl. 139-383.00A.
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Le Ludec, Joel, to Rhone-Poulenc Industries. Process for the preparation of hydroxybenzaldehydes. 4,026,950, Cl. 260-600.00R.
Lema, Leo A., to Modine Manufacturing Company. Method of attaching a tube to a wall. 4,026,456, Cl. 228-136.000.
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Leone, Anthony R.; and Yakim, Andrew, to Acme-Hamilton Manufacturing Corporation. Method and apparatus for breaking and stripping hose from a mandrel. 4,026,003, Cl. 29-427.000.
Leonhart, Charles J., to Nuarc Company, Inc. Portable processing station. 4,026,649, Cl. 355-27.000.
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Lesk, Israel Arnold, to Motorola, Inc. Integrated semiconductor structure with combined dielectric and PN junction isolation including fabrication method therefor. 4,026,736, Cl. 148-187.000.
Lessman, Gerhard. Catadioptrically coupled color television projection system. 4,027,328, Cl. 358-64.000.
LeSuer, William Monroe, to Lubrizol Corporation, The. Phosphorus, nitrogen and sulfo-containing additives. 4,026,812, Cl. 252-75.000.
Leu, Gerhard; Sulser, Ueli; Widmer, Jurg; and Goeth, Heinz, to Sika AG, vormals Kaspar Winkler & Co. Method for deactivating the catalyst in a polyurethane prepolymer. 4,026,875, Cl. 260-77.50A.
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Levy, Didya D., to Hydro Med Sciences Inc. Bone generating method and device. 4,026,304, Cl. 128-419.00F.
Lewis, Cyril John, to Imperial Chemical Industries Limited. Phosphate glass compositions. 4,026,714, Cl. 106-47.00R.
Lewis, Nathanial Henry. Bike carrier sleeper. 4,026,448, Cl. 224-32.00A.
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Liedtke, Hans George, to International Business Machines Corporation. Laser drilling nozzle. 4,027,137, Cl. 219-121.00L.
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Lindholm, Ulric S.: *See—*
Nagy, Andrew; Lindholm, Ulric S.; and Yeakley, Lester M., 4,026,145.
Lindqvist, Bo Lars Einar. Arrangement for supplying or removing gaseous substances to or from a movable object. 4,026,200, Cl. 98-115.0VM.
Linkroum, Irving E., to Bendix Corporation, The. Capacitor discharge ignition system. 4,027,198, Cl. 315-209.0CD.
Lion Oil Company: *See—*
Koons, Russell E., 4,027,059.
Litchford, George B., to Litchstreet Co. Collision avoidance/proximity warning system using secondary radar. 4,027,307, Cl. 343-6.5LC.
Litchstreet Co.: *See—*
Litchford, George B., 4,027,307.
Litton Business Systems, Inc.: *See—*
Ziegler, Robert D., 4,026,508.
Litton Industrial Products, Inc.: *See—*
Sarley, John F., 4,026,415.
Livick, Lester R. Adjustable device for feeding work pieces of different thicknesses past a rip saw for cutting purposes. 4,026,173, Cl. 83-421.000.
Livingston, Andrew D., to Guaranty Performance Co., Inc. Process for treating municipal wastes to produce a fuel. 4,026,678, Cl. 44-1.00D.
Loch, Ernst, to Zellweger Uster Ltd. Method and apparatus for the moisture measurement of flat structures, especially textile webs. 4,027,238, Cl. 324-65.00R.
Lockard, John C.: *See—*
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Lodige, Fritz: *See—*
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Lodige, Wilhelm; Lodige, Fritz; and Lucke, Josef. Vacuum filter for the purification of gaseous materials. 4,026,686, Cl. 55-269.000.
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Loeliger, Peter: *See—*
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Logan, Douglas Patton, to Calgon Corporation. Sulfide detection device. 4,026,667, Cl. 23-230.00R.
Login, Robert Bernard; Deck, Charles Francis; and Thir, Basil, to BASF Wyandotte Corporation. Polyoxyalkylated polyol polyesters having improved antistatic properties. 4,026,941, Cl. 260-475.00P.
Lohberg, Rolf: *See—*
Hoppner, Klaus; Landwehr, Gotz; Wilhelm, Adolf; Meyer, Wolfgang; Frers, Gerd; Lohberg, Rolf; Reiff, Dieter; Forderer, Karl; and Kosiollek, Helmut, 4,026,020.
Lohrmann, Dieter R., to United States of America, Army. Battery charge indicator. 4,027,231, Cl. 324-29.500.
Lokey, Robert C., to Lokey Tool, Inc. Rotary insulated saw blade. 4,026,177, Cl. 83-835.000.
Lokey Tool, Inc.: *See—*
Lokey, Robert C., 4,026,177.
Lombard, William K., to Trecan Limited. Sludge incinerator. 4,026,224, Cl. 110-8.00C.
Long Mfg. N. C., Inc.: *See—*
Long, William R., 4,026,431.
Long, William R., to Long Mfg. N. C., Inc. Tobacco harvester having a bulk container filled by manual primers. 4,026,431, Cl. 214-519.000.
Look, Thomas F., to Minnesota Mining and Manufacturing Company. Interfacing circuit. 4,027,208, Cl. 361-194.000.
Lorenze, Robert V., Jr.; and Young, Miriam F., to Honeywell Inc. Photodetector array delineation method. 4,027,323, Cl. 357-30.000.
Lotz, Walter Edward. Meat slice stacking apparatus. 4,026,421, Cl. 214-6.0DK.
Louis, Eckhart: *See—*
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Lo Valvo, Ernesto; Diotallevi, Gianfranco; and Lagana, Carlo, to Montedison S.p.A. Process for preparing elastomeric copolymers of vinylidene fluoride and the elastomeric copolymers obtained thereby. 4,027,086, Cl. 526-79.000.
Lovelace, Joe B.: *See—*
Motsinger, Donald L.; Nalley, Charles E.; and Lovelace, Joe B., 4,027,071.
Loveland, Winton, to Loveshaw Corporation, The. Means in automatic carton closing machines to support undersides of down-folded top side flaps during anchorage operations. 4,026,090, Cl. 53-374.000.
Loveless, Stanley M., to General Gas Light Company. Miniature four-way valve. 4,026,325, Cl. 137-625.260.
Loveshaw Corporation, The: *See—*
Loveland, Winton, 4,026,090.
Lovett, Joe Bryant; and Dickerson, James Hinton, Jr., to Dow Chemical Company, The. Making a pelletized glass batch for soda-lime glass manufacture. 4,026,691, Cl. 65-27.000.
Lovette, Norris G., Jr, Norris G., to Air Products and Chemicals, Inc. Process for reclaiming rubber, metal and fabric from whole tires. 4,025,990, Cl. 241-14.000.
Lowe, Grayson. Coupling for conduits. 4,026,584, Cl. 285-96.000.
Lowther, Frank Eugene, to Union Carbide Corporation. High frequency power supply. 4,027,169, Cl. 250-536.000.
Lubrizol Corporation, The: *See—*
Jahnke, Richard William, 4,026,856.
LeSuer, William Monroe, 4,026,812.
Lucas Electrical Company Limited, The: *See—*
Martin, Frederick Raymond Patrick, 4,027,149.
Luchsinger, Charles R.; and Joslyn, John. Photographic chemical liquid agitator. 4,026,531, Cl. 259-72.000.
Luck, Heinrich: *See—*
Hartmann, Franz; Luck, Heinrich; and Golnitz, Holger, 4,025,988.
Lucke, Josef: *See—*
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Mack, Walter E.: *See—*
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MacNeill, Robert L.: *See—*
Friedrich, Richard A.; and MacNeill, Robert L., 4,026,800.
Macrander, Max S.; and Kowalik, Ronald F., to GTE Automatic Electric Laboratories Incorporated. Direct current compensation circuit with current threshold detection. 4,027,235, Cl. 323-48.000.
Madan, Bhim S., to General Electric Company. Mixer locking structure. 4,026,532, Cl. 259-104.000.
Madden, Albert John; and Spedding, Peter Lee, to Exhal Industries Limited. Apparatus for supplying fuel to a combustion engine. 4,026,257, Cl. 123-124.00R.
Madden, Bonnie B.: *See—*
Grow, Harlow B., 4,026,500.
Madsen, Roland X. Time controllable cigarette dispenser. 4,026,436, Cl. 221-15.000.
Maeda, Shigeyoshi: *See—*
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Maeder, Arthur: *See—*
Nachbur, Hermann; and Maeder, Arthur, 4,026,889.
Maegawa, Harumi; and Matsuda, Junzo, to Fujitsu Ltd. Magnetic bubble device. 4,027,295, Cl. 340-174.0TF.
Magee, John E. Elevator car passenger security system. 4,026,389, Cl. 187-29.00R.
Magnavox Company, The: *See—*
Streeter, Robert D.; and Mohr, John G., 4,027,099.
Maguire, Edward A., Jr.: *See—*
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Maher, Galeb H., to Sprague Electric Company. Ceramic capacitor having a silver doped dielectric of $(Pb,La)(Zr,Ti)O_3$ and glass. 4,027,209, Cl. 361-361.000.
Mahler, Henry W.: *See—*
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Mai, Gerhard: *See—*
Kummer, Franz; Mai, Gerhard; Ruthardt, Rolf; and Thiede, Horst, 4,027,326.
Majos, Jacques; and Lardy, Jean-Louis A. Binary multiplication unit with partial product and sum calculation time higher than multiplicand bit interval. 4,027,147, Cl. 235-164.000.
Makleit, Sandor: *See—*
Knoll, Jozsef; Furst, Zsuzsanna; Meszaros, Zoltan; Szentmiklosi, Peter; David, Agoston; Hermecz, Istvan; Mandi, Attila; Bognar, Rezso; Makleit, Sandor; Valovics, Gyula; Szavik, Laszlo; and Nagy, Sandor, 4,027,024.
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Manner, James A., to PPG Industries, Inc. Storage stabilized methylchloroform formulations. 4,026,956, Cl. 260-652.50R.
Manning, Donald Franklin; and Wolfe, Bruce Allen, to International

Business Machines Corporation. Ink jet printer apparatus and method of printing. 4,027,309, Cl. 346-1.000.
Manning, Harold E., to Petro-Tex Chemical Corporation. Chromium modified manganese ferrite oxidative dehydrogenation catalysts. 4,026,920, Cl. 252-470.000.
Mansfield, Ernest Bryant; and Gibboney, Dennis A., to Fisher Scientific Company. Method and apparatus for sulfur analysis. 4,026,665, Cl. 23-230.0PC.
Manty, Brian A., to United States of America, Air Force. Method of coating titanium. 4,026,734, Cl. 148-6.15R.
Mapco, Inc.: *See*—
Fowler, Leslie L., 4,026,805.
Maples, Glennon: *See*—
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Marbet, Roman, to Hoffmann-La Roche Inc. Oxidation process using nickel peroxide oxidizing agents. 4,026,910, Cl. 260-410.90R.
Marchandeau, Christian: *See*—
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Marchenko, Alexandr Mikhailovich: *See*—
Shmakov, Eduard Ivanovich; Medovar, Boris Izrailevich; Chvertko, Anatoly Ivanovich; Koval, Vladimir Vasilievich; Fedotenkov, Vyacheslav Georgievich; Bondarenko, Oleg Petrovich; Kravchuk, Anatoly Iosifovich; Marchenko, Alexandr Mikhailovich; and Bogachenko, Alexei Georgievich, 4,027,233.
Marin, Heiner; and Muller, Alfred, to Siemens Aktiengesellschaft. Contact system for high-voltage power circuit breakers. 4,027,124, Cl. 200-146.00R.
Marosko, Ronald Jon, to TRW Inc. Multiplexed data monitoring system. 4,027,286, Cl. 340-171.00R.
Marquardt, Klaus: *See*—
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Marquez, Joseph A.: *See*—
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Marsch, Hans-Dieter, to Friedrich Uhde GmbH. Heat exchanger for nuclear reactor installations. 4,026,675, Cl. 23-288.00M.
Marter, V. C. Floating bar ball bearing lock device. 4,026,133, Cl. 70-134.000.
Martin, Erwin, to Siemens Aktiengesellschaft. Electroacoustic sound generator. 4,027,115, Cl. 179-179.000.
Martin, Forrest D. Telephone handset indicia holder. 4,026,033, Cl. 40-336.000.
Martin, Frederick Raymond Patrick, to Lucas Electrical Company Limited, The. Motor vehicle with tiltable headlamps. 4,027,149, Cl. 240-7.1LJ.
Martinez, Carlos J.: *See*—
Brown, George L.; and Martinez, Carlos J., 4,026,857.
Martinez, Eleuterio Ruiz. Hill plower. 4,026,373, Cl. 180-9.220.
Maschinenbau Oppenweiler GmbH: *See*—
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Maschinenfabrik Schweiter AG.: *See*—
Rebsamen, Arthur, 4,026,482.
Mascioli, Rocco L.: *See*—
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Masclet, Jean, to Messier Hispano. Ski devices for mounting on landing gear having wheels disposed in tandem. 4,026,502, Cl. 244-108.000.
Masco Corporation of Indiana: *See*—
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Maslowski, Stefan; Huber, Peter; and Redlich, Horst, to TED-Bildplatten Aktiengesellschaft, AEG-Telefunken, TELDEC. Disc recording. 4,027,330, Cl. 358-128.000.
Massey-Ferguson Services N.V.: *See*—
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Masuda, Yougoro; Sato, Takashi; and Kawase, Shigeru, to Kanebo, Ltd. Process for electrostatic direct transfer printing of designs on fabrics. 4,027,049, Cl. 427-19.000.
Masui, Tokio: *See*—
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Mathe, Birgit T.: *See*—
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Matono, Hirokuni: *See*—
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Matsuda, Hideya: *See*—
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Matsuoka, Yoshifumi: *See*—
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Matsushima, Hiroshi: *See*—
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Matsuzaka Company: *See*—
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Matthews, W. Thomas, to Dow Chemical Company, The. Method of removing dissolved non-condensibles from geothermal brines. 4,026,111, Cl. 60-641.000.
Mattler, Martin. Combination clamping/cutting apparatus and methods of using same. 4,026,294, Cl. 128-305.000.
Mattson, Charles T. Vehicular wheel adjusting device. 4,026,578, Cl. 280-661.000.
Matyschik, Otto; and Kuhnlein, Leo, to SKF Industrial Trading and Development Company, B.V. Clutch release bearing. 4,026,398, Cl. 192-98.000.
Mauceri, Frank A., to Nalco Chemical Company. Process for resolving oil-in-water emulsions by the use of a cationic polymer and the water soluble salt of an amphoteric metal. 4,026,794, Cl. 210-43.000.
Maul, Bernhard: *See*—
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May, James A., to Dow Chemical Company, The. Valve type shipping bag. 4,026,460, Cl. 229-62.500.
Mayberry, Derral; Sawardeker, Jawahar; and McShefferty, John, to Ortho Pharmaceutical Corporation. Method and apparatus for inserting an intrauterine contraceptive device. 4,026,281, Cl. 128-130.000.
Mayer, Hans Johann: *See*—
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McBride, Donald Gene; and Pallady, Philip Harold, to International Business Machines Corporation. Method of making ingrown lead frame with strain relief. 4,026,759, Cl. 156-632.000.
McBride, Richard D.: *See*—
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McCay, Frank Vernon, Jr., deceased (by Continental Bank & Trust Co., The, administrator), to United States of America, Interior. Movable roof support mechanism. 4,026,118, Cl. 61-63.000.
McClain, Dorothee M.; and Vest, Betty L., to National Distillers and Chemical Corporation. Finely divided saponified ethylene-vinyl acetate interpolymers. 4,027,079, Cl. 526-10.000.
McClellan, Walter L., to J.C. Baxter Co. Forming tube for winding glass fibers and method for using same. 4,026,690, Cl. 65-2.000.
McCord Corporation: *See*—
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McCreary, William M.: *See*—
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McDonald, John P.: *See*—
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McDonald, John Patrick; and Kwatny, Harry G., to McDonald, John P. Advanced control system for power generation. 4,027,145, Cl. 235-151.210.

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Meikle, Lee B. Field anchor. 4,026,080, Cl. 52-159.000.

Melchior, Jean F.; and Andre, Thierry, to French State, The. Supercharged internal combustion engines, in particular diesel engines. 4,026,115, Cl. 60-614.000.

Menke, Manfred, to ERNO Raumfahrttechnik GmbH. Two-part nut. 4,026,341, Cl. 151-41.740.

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Merck Patent Gesellschaft mit beschrankter Haftung: *See—*
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Merrill, Duane F., to General Electric Company. Process for producing a low viscosity silicone resin. 4,026,868, Cl. 260-46.50R.

Merritt, Robert E., to Renfro Corporation. Method of and apparatus for determining surface characteristics, such as coefficient of friction, of a moving strip of material. 4,026,141, Cl. 73-9.000.

Mertens, Gottfried: *See—*
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Merzagora, Frank, to Rotobind Ltd. Printing apparatus and method. 4,026,210, Cl. 101-350.000.

Messerschmidt, Dieter; Kluge, Johannes; and Schleyer, Meinolf, to Demag Aktiengesellschaft. Hoisting gear. 4,026,526, Cl. 254-168.000.

Messersmith, Robert Earl, to Hoffmann-La Roche Inc. Method of combatting swine dysentery. 4,027,034, Cl. 424-283.000.

Messier Hispano: *See—*
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Messina, Ralph P., to Colgate-Palmolive Company. Antiperspirants formulated with borax. 4,027,007, Cl. 424-46.000.

Meszaros, Zoltan: *See—*
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Meusburger, Guenther; and Wotruba, Gottfried, to Siemens Aktiengesellschaft. Compensation element for dynamic semiconductor stores, and method of operating the same. 4,027,294, Cl. 340-173.0CA.

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Meyers, Theodore F., to Hobart Corporation. Jam breaking method for comminuting device. 4,026,480, Cl. 241-30.000.

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Migirian, George. Drum. 4,026,185, Cl. 84-411.00R.

Miles Laboratories, Inc.: *See—*
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Miles, Malcolm G.: *See—*
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Miller, Evelyn: *See—*
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Gardiner, Robert A., 4,026,867.
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Miura, Seishi, to Honda Giken Kogyo Kabushiki Kaisha. Bicycle with an internal combustion engine. 4,026,374, Cl. 180-33.00C.
Miura, Seishi, to Honda Giken Kogyo Kabushiki Kaisha. Bicycle with an internal combustion engine. 4,026,375, Cl. 180-33.00C.
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Williams, Dick S., 4,026,606.
Mont, George E.; and Snelgrove, James A., to Monsanto Company. Laminated safety glass prepared from buffered acetal. 4,027,069, Cl. 428-437.000.
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Moorehead, Thomas J.; and Gauthier, John A., to GTE Automatic Electric (Canada) Limited. Modular register and sender arrangement. 4,027,108, Cl. 179-18.0EB.
Moran, Richard J.; and Le Court, William N., to McGraw-Edison Company. Protective switch device for electrical distribution systems. 4,027,203, Cl. 361-98.000.
Moravchik, Joseph L., to Orion Corporation. Thrust bearing. 4,026,613, Cl. 308-160.000.
Moreillon, Rene; and Weber, Claude, to Societe Suisse pour l'Industrie Horlogere (SSIH) Management Services S.A. Housing and support for piezo-electric resonator. 4,027,181, Cl. 310-9.400.
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Morozowich, Walter, to Upjohn Company, The. PGD_2 Substituted esters. 4,026,919, Cl. 260-468.00D.
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Morrow, Willie L. Afro comb. 4,026,307, Cl. 132-11.00R.
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Motomura, Mitsuteru; Kojima, Chiaki; Ohta, Hiroshi; and Nemoto, Akira, to Kabushiki Kaisha Komatsu Seisakusho. Ground excavating apparatus. 4,026,604, Cl. 299-64.000.
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Mott, James D., to Hydril Company. Subsurface well apparatus having improved operator means and method of using same. 4,026,362, Cl. 166-314.000.
Moyer, Norman E., to Hughes Aircraft Company. Push button response of combination LCD/LED wristwatch. 4,026,101, Cl. 58-50.00R.
Mozingo, Robert Eugene, to J. I. Case Company. Brake pedel assembly. 4,026,164, Cl. 74-478.000.
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Naarding, Bill J.; and Hergeth, Herbert, to Hergeth KG Maschinenfabrik und Apparatebau. Opening and cleaning machine for fibrous material, especially cotton. 4,025,989, Cl. 19-93.000.

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Naegeli, Werner, to Pavena AG. Apparatus for controlling a winding device for a continuously supplied fiber sliver. 4,026,484, Cl. 242-45.000.

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Nakata, Takashi: *See*—
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Neidermyer, Robert W.: *See*—
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Neil, Thomas J. Sectional paint brush. 4,025,980, Cl. 15-202.000.

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Neosho Products Company: *See*—
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Netto, Daniel J. Supporting and drive systems for *X-Y* table. 4,026,536, Cl. 269-73.000.

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Still, Robert C., 4,026,517.

New England Nuclear Corporation: *See*—
Adler, Norman; Camin, Leopoldo Lazaro; and Gold, Paul, 4,027,005.

Newell, Dennis E., to Robertshaw Controls Company. Control circuit with time delay. 4,027,221, Cl. 318-484.000.

Newell, Dennis E.: *See*—
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Newman, Wendell D.: *See—*
Breaux, Paul W.; Newman, Wendell D.; and Quinnett, Philip E., 4,026,955.
Newnham, Robert E.: *See—*
Cross, Leslie E.; Kunz, Raymond J.; and Newnham, Robert E., 4,027,074.
Nicol, Richard Charles, to Post Office, The. Digital television system. 4,027,331, Cl. 358-135.000.
Niederprum, Hans: *See—*
Schneider, Siegfried; Weis, Wolfgang; Beyl, Volker; and Niederprum, Hans, 4,026,997.
Nieschulz, Otto; Rudiger, Gunther; and Maass, Jurgen, to Merck Patent Gesellschaft mit beschrankter Haftung. Process for the production of allergen-containing extracts. 4,027,006, Cl. 424-12.000.
Nieuwendijk, Joris Adelbert Maria: *See—*
Van Alphen, Willem Meijndert; Barten, Piet Gerard Joseph; Van Den Boogert, Johannes; Nieuwendijk, Joris Adelbert Maria; Gerritsen, Jan; and Kantelberg, Adrianus Hubertus, 4,027,219.
Niida, Taro: *See—*
Ezaki, Norio; Amano, Shoichi; Miyado, Shinji; Ito, Mitsugu; Nojiri, Chuhei; Tsuruoka, Takashi; Yamada, Yujiro; and Niida, Taro, 4,027,014.
Nikitin, Arkady Viktorovich: *See—*
Berezin, Gennady Nikolaevich; Gurzheev, Valery Nikolaevich; Zakharov, Vladimir Ivanovich; Nikitin, Arkady Viktorovich; and Suris, Robert Arnoldovich, 4,026,743.
Nikolic, Cvetko B.; and Laferty, John M., to Amax Inc. Precipitation of selenium from copper electrowinning solutions. 4,026,797, Cl. 210-50.000.
Ninagawa, Yoichi: *See—*
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Nino Aktiengesellschaft: *See—*
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Nippon Concrete Industries Co. Ltd.: *See—*
Abe, Nobuyuki; Yanashima, Ikuo; and Ohiwa, Kenjiro, 4,026,582.
Nippon Electric Company, Ltd.: *See—*
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Ishiguro, Tatsuo, 4,027,100.
Okamoto, Kiyokazu; Isomura, Masayoshi; and Kobayashi, Atsuto, 4,027,292.
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Nippon Gakki Seizo Kabushiki Kaisha: *See—*
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Nippon Oil Company Ltd.: *See—*
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Nippon Soken, Inc.: *See—*
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Nippon Steel Corporation: *See—*
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Takahari, Tomoo; Kondo, Shiyuichi; Sone, Nobumasa; Hashimoto, Kengi; and Ishiguro, Tadashi, 4,026,737.
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Nishida, Takashi; Ninagawa, Yoichi; Itoi, Kazuo; Omura, Yoshiaki; Tamai, Yoshin; Hosogai, Takeo; and Fujita, Yoshiji, to Kuraray Co., Ltd. 2,7,10,15,18,23-Hexamethyltetra-cosane. 4,026,960, Cl. 260-676.00R.
Nishide, Sadao: *See—*
Kobatake, Takashi; Takeda, Kyosuke; Nishide, Sadao; and Saito, Tetsuo, 4,026,095.
Nishii, Yasuho: *See—*
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Nishijima, Koji: *See—*
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Nishino, Katsumi; and Konomi, Toshiaki, to Toyota Jidosha Kogyo Kabushiki Kaisha. Fuel-air mixture supply system. 4,026,253, Cl. 123-127.000.
Nishioka, Tsugio: *See—*
Shiga, Shujiro; Katsumata, Takeshi; Inaba, Eiji; Okamoto, Yasushi; Inmaru, Atsushi; Nishioka, Tsugio; Nakata, Takashi; and Takaki, Seiji, 4,026,992.
Niskin, Shale J. Water flow meter. 4,026,148, Cl. 73-185.000.
Nissan Motor Co., Ltd.: *See—*
Koike, Syouichi, 4,026,598.
Tamazawa, Tsuyoshi; and Kunugi, Takashi, 4,026,106.
Nissen, Warren I., to Gillette Company, The. Razor blade assembly. 4,026,016, Cl. 30-47.000.
Nisshin Steel Co., Ltd.: *See—*
Kishida, Hideaki; Fukuoka, Hiroshi; and Kameyama, Teruhiko, 4,027,095.
Nitkovskikh, Anatoly Anatolievich: *See—*
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Noack, Manfred G., to Olin Corporation. Catalyzed hydrazine compound corrosion inhibiting composition containing a quinone compound and a complex of metal salt and an ortho aromatic compound. 4,026,664, Cl. 21-2.70R.
Nobutomo, Kazunari: *See—*
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Noguchi, Kazuo: *See—*
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Nojiri, Chuhei: *See—*
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Nomiya, Kosei; and Kikuchi, Tadao, to Hitachi, Ltd. Gate circuit. 4,027,173, Cl. 307-200.00B.
Norbeck, Dean King, to Borg-Warner Corporation. Phase failure detection circuit for multi-phase systems. 4,027,204, Cl. 361-1.000.
Nord, Eric T.: *See—*
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Nordhausen, Lloyd J.: *See—*
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Nordson Corporation: *See—*
Crum, Gerald W.; Nord, Eric T.; Reighard, Alan B.; and Tamny, Simon Z., 4,026,440.
Noren, Carl Anders; and Sundin, Bertil Waldemar, to Atlas Copco Aktiebolag. Motor driven by a pressurized fluid medium for operating an impacting tool in a linear direction. 4,026,192, Cl. 91-25.000.
Norlin Music, Inc.: *See—*
Fuller, Walter Leonard, 4,026,178.
North, William D.: *See—*
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NRG Nufuel Company: *See—*
Johnson, Robert D.; and Altmann, Robert S., 4,026,355.
Nuarc Company, Inc.: *See—*
Leonhart, Charles J., 4,026,649.
Nuber, Otto. Method of knitting knit plush fabric having a nap, or pile loops. 4,026,126, Cl. 66-9.00R.
Nudenberg, Walter: *See—*
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N.V. Internationale Octrooi Maatschappij "Octropa": *See—*
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Oakley, Robert Vincent: *See—*
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Obikawa, Tadahiko; and Itoh, Shigemasa, to Konishiroku Photo Industry Co., Ltd. Silver halide photographic emulsion sensitized with a mixture of oxacarbocyanine dyes. 4,026,707, Cl. 96-95.000.
Oce-van der Grinten N.V.: *See—*
Knoops, Theodorus, 4,026,539.
van den Brink, Michiel; and Stoot, Andreas C., 4,026,702.
van Megen, Hubertus Johannes, 4,026,452.
Ochs, William R. Lighted fishing rod. 4,026,059, Cl. 43-17.500.
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Oeschger, Joseph E., to International Telephone and Telegraph Corporation. Vacuum relay with reduced sensitivity to manufacturing tolerances and optional latching feature. 4,027,277, Cl. 335-151.000.
Off, Joseph W. A.; and Early, Judson Horace, to Hagger Company. Belt loop trimming apparatus. 4,026,172, Cl. 83-106.000.
Ogata, Yoshihiro, to Toko Incorporated. Dynamic decoder circuit. 4,027,174, Cl. 307-205.000.
Ogontz Controls Company, Inc.: *See—*
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Ohiwa, Kenjiro: *See—*
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Okamoto, Hiroshige; Watanabe, Shiro; Yuasa, Katsumi; Takano, Mitsuo; Fukinbara, Itaru; and Yano, Nobumitsu, to Asahi Kasei Kogyo Kabushiki Kaisha. Method for the regeneration of activated carbon. 4,026,795, Cl. 210-30.00A.

Okamoto, Kiyokazu; Isomura, Masayoshi; and Kobayashi, Atsuto, to Nippon Electric Company, Limited. Synchronous data processing system having arithmetic and control units controlled by single-phase clock pulses. 4,027,292, Cl. 340-172.500.

Okamoto, Yasushi: *See—*
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Olin Corporation: *See—*
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Ford, James M., 4,026,785.
Noack, Manfred G., 4,026,664.

Olmsted, Peter B., to Raymond International Inc. Hydraulically driven hammer system. 4,026,193, Cl. 91-216.00B.

Olofsson, Hans Kristoffer, to Atlas Copco Aktiebolag. Device for driving a pump piston. 4,026,196, Cl. 92-140.000.

Olschewski, Armin: *See—*
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Olson, Oscar R. Tool for removing valve lifters. 4,026,002, Cl. 29-280.000.

Olympus Optical Co., Ltd.: *See—*
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Omori, Hisashi, to Kabushiki Kaisha Kawamura Saikuru. Bicycle pedaling stand. 4,026,546, Cl. 272-73.000.

Omura, Morikazu; Okuda, Yukio; and Kainuma, Hiroyuki, to Sawafuji Electric Company, Ltd. Electrical vibration type compressor. 4,027,211, Cl. 318-127.000.

Omura, Yoshiaki: *See—*
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Oniwa, Ryoji: *See—*
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Optical Coating Laboratory, Inc.: *See—*
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Orban, Ferenc; Orban, Maria; Pinter, Tihamer; Zsigmond, Gyorgy; Siklosi, Peter; Solymar, Karoly; Toth, Pal; and Zambo, Janos, to Aluminiumipari Tervezo Vallalat; and Femipari Kutato Intezet. Process for the digestion of goethite-containing bauxites. 4,026,989, Cl. 423-121.000.

Orban, Maria: *See—*
Orban, Ferenc; Orban, Maria; Pinter, Tihamer; Zsigmond, Gyorgy; Siklosi, Peter; Solymar, Karoly; Toth, Pal; and Zambo, Janos, 4,026,989.

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Orth, George Otto, Jr., to Kalbfleisch, Herbert L. Filter system and method of filtering animal processing wastes. 4,026,792, Cl. 210-27.000.

Ortho Pharmaceutical Corporation: *See—*
Mayberry, Derral; Sawardeker, Jawahar; and McShefferty, John, 4,026,281.
Shroff, Arvin Pranlal, 4,027,019.

Orton, Horace L. Household liquid dispenser. 4,026,442, Cl. 222-181.000.

Osaka, Shinobu: *See—*
Nakaoka, Kazuhide; Araki, Kenji; Shimomura, Takayoshi; Kubotera, Haruo; Osaka, Shinobu; Tanaka, Nobuo; Kuroda, Hiroshi; and Kurihara, Takao, 4,026,729.

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Osrodek Badawczo-Rozwojowy Przemyslu Budowy Urzaszen Chemicznych "Cebea": *See—*
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Ostling, Hans Martin, to Forenade Fabriksverken. Hollow-charge shell and antitank weapon for said shell. 4,026,211, Cl. 102-24.0HC.

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Otsuka Pharmaceutical Company: *See—*
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Ottaviano, Gary W., to Ranpak Corporation. Cushioning dunnage mechanism, transfer cart therefor, and method. 4,026,198, Cl. 93-1.0WZ.

Outboard Marine Corporation: *See—*
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Owen, William H., III; Steele, Charles H. R.; and Pashley, Richard D., to Intel Corporation. Process for defining pol, crystalline silicon patterns. 4,026,733, Cl. 148-1.500.

Owen, William H., III, to Intel Corporation. Process for fabricating narrow polycrystalline silicon members. 4,026,740, Cl. 156-628.000.

Owens-Corning Fiberglas Corporation: *See—*
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Higginbotham, James M., 4,026,689.
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Owens-Illinois, Inc.: *See—*
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Kusz, Maximillian; and Lovalenti, Sam, 4,026,656.

Owens, Lester J., to United States of America, National Aeronautics and Space Administration. Magnetic electrical connectors for biomedical percutaneous implants. 4,025,964, Cl. 3-1.000.

Oyabu, Masaaki: *See—*
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Ozaki, Masatake: *See—*
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Kageyama, Kunio; Hirakawa, Hiroshi; Ozaki, Masatake; Sugiyama, Iwao; Iwakura, Mitsuharu; and Someya, Yoshiaki, 4,026,878.

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Pallos, Ferenc M.: *See—*
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Palmer, Ray L. Cleaning device. 4,025,982, Cl. 15-106.000.

Palomares, Severiano, to Policastilla, S/A. Continuous producton of expanded cellular material of circular cross section. 4,026,979, Cl. 264-45.500.

Pape, Georg: *See—*
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Papko, Grigory Fedoseevich: *See—*
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Papp, Joseph. Dual brake actuating handle bars and bicycle neck assembly. 4,026,165, Cl. 74-480.00R.

Parekh, Girish Girdhar; and Blank, Werner Josef, to American Cyanamid Company. Composition of matter particularly adaptable for use in electrodepositing films on metal. 4,026,855, Cl. 260-29.4UA.

Parke, Davis & Company: *See—*
Elslager, Edward Faith, 4,026,899.

Parker, Alfred B.: *See—*
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Parker, Blaine Frank, to University of Kentucky Research Foundation. Solar fluid heater with electromagnetic radiation trap. 4,026,273, Cl. 126-271.000.

Parker, Gerald R.: *See—*
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Parker-Hannifin Corporation: *See—*
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Parsons, Brinckerhoff, Quade & Douglas, Inc.: *See—*
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Parsons, Charles John, to International Business Machines Corporation. Electrical safety bypass. 4,027,207, Cl. 361-404.000.
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Partridge, John Joseph, Jr.: *See—*
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Pashley, Richard D.: *See—*
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Patchornik, Abraham: *See—*
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Patel, Mahesh G.: *See—*
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Patin, Henry A., to Patin, Barbara J., a part interest. Word game using lettered tiles. 4,026,558, Cl. 273-137.00C.
Patterson, James T. Flexible drive adapter. 4,026,125, Cl. 64-7.000.
Patterson, Ray, to Raymond Lee Organization, Inc., The. Exhaust vent filter. 4,026,688, Cl. 55-309.000.
Patterson, Roy Earl: *See—*
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Pattyn, Herman Alberik: *See—*
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Paugh, Edward C.; and Broughton, Dan Q., to Ormco Corporation. Orthodontic appliance. 4,026,022, Cl. 32-14.00A.
Paulson, John K.; Steffan, Walter J.; and Smith, Tommy L., to Jo Paul Industries, Inc. Coacting wheels type football throwing device. 4,026,261, Cl. 124-78.000.
Paup, Robert E.; and Blair, James F., to Recognition Equipment Incorporated. Automated processing of financial documents. 4,027,142, Cl. 235-61.90R.
Pausch, Josef, to General Resource Corporation. Method of changing the length of a Venturi throat. 4,026,682, Cl. 55-84.000.
Pavena AG: *See—*
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Pearson, Walter G. Article handling and placement apparatus. 4,026,091, Cl. 53-390.000.
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Phillips, Raymond M.; and Pease, William J., 4,025,975.
Peck, William H.: *See—*
Adams, James S.; Peck, William H.; and Tekulve, Daniel R., 4,025,972.
Peek, Henry L.; Mehta, Kanti V.; Abdou, John J.; and Patel, Amrut R., to Allis-Chalmers Corporation. Gas insulated circuit breaker. 4,027,125, Cl. 200-148.00R.
Pell, Raymond H., to National Steel Corporation. Method and apparatus for changing rolls for a rolling mill. 4,026,136, Cl. 72-238.000.
Pellerin, Daniel: *See—*
Dardaine, Edgar; Berry, Jean-Luc; Siard, Michel; and Pellerin, Daniel, 4,026,982.
Pennsylvania Research Corporation: *See—*
Schweitzer, Paul H.; Volz, Carl; and Collins, Thomas W., 4,026,251.
Penrose, Richard M.: *See—*
Driffield, John B.; Kerr, Howard S.; Penrose, Richard M.; and Stonell, Anthony C., 4,027,160.
Pensa, Carlo, to Massey-Ferguson Services N.V. Control devices for hydrostatic transmissions. 4,026,108, Cl. 60-444.000.
Perkins Engines Limited: *See—*
Sparrow, Alan Wycliffe, 4,026,562.
Peroxid-Chemie GmbH: *See—*
Amtmann, Rudolf; Seidl, Hans; and Twittenhoff, Hansjoachim, 4,027,080.
Perreault, Donald A., to Xerox Corporation. Frequency domain automatic equalizer having logic circuitry. 4,027,257, Cl. 333-18.000.
Perreault, Donald A., to Xerox Corporation. Time domain automatic equalizer with frequency domain control. 4,027,258, Cl. 333-18.000.
Perrine, Ralph J., to Electric Furnace Company, The. Method for heat treating wire. 4,026,731, Cl. 148-134.000.
Perrot, Friedrich: *See—*
Giger, Urs; and Perrot, Friedrich, 4,026,104.
Pertec Computer Corporation: *See—*
Harman, Jefferson H., 4,027,217.
Perucca, Giovanni: *See—*
Belforte, Piero; Guaschino, Giancarlo; and Perucca, Giovanni, 4,027,106.
Peters, Rita Moore. Cape for dealing with the hair. 4,025,961, Cl. 2-88.000.
Pethica, Brian Anthony: *See—*
Johnson, George Arthur; Ewart, Martin Rodney; and Pethica, Brian Anthony, 4,026,814.
Petro-Tex Chemical Corporation: *See—*
Manning, Harold E., 4,026,920.
Petrocci, Alfonso N.: *See—*
Green, Harold A.; Merianos, John J.; and Petrocci, Alfonso N., 4,026,945.
Green, Harold A.; Merianos, John J.; and Petrocci, Alfonso N., 4,027,020.
Petrolite Corporation: *See—*
Quinlan, Patrick M.; and McBride, Richard D., 4,026,807.
Quinlan, Patrick M., 4,026,946.
Petzoldt, Karl: *See—*
Furst, Andor; Muller, Marcel; Alig, Leo; Keller, Peter; Kerb, Ulrich; Wiechert, Rudolf; Kieslich, Klaus; and Petzoldt, Karl, 4,026,918.
Furst, Andor; Muller, Marcel; Alig, Leo; Keller, Peter; Kerb, Ulrich; Wiechert, Rudolf; Kieslich, Klaus; and Petzoldt, Karl, 4,026,921.
Pfeiffer, Hartmut; Hilbig, Manfred; and Krella, Wolfgang, to Polysius AG. Sample taking apparatus. 4,026,154, Cl. 73-423.00R.
Pfeiffer, John B.: *See—*
Henderson, James M.; and Pfeiffer, John B., 4,027,001.
Pfiffner, Albert: *See—*
Chodnekar, Madhukar Subraya; Loeliger, Peter; Schwieter, Ulrich; Pfiffner, Albert; Suchy, Milos; and Zurflub, Rene, 4,027,033.
Pfizer Inc.: *See—*
Barth, Wayne E., 4,026,881.
Philips, Francis X. Connector housing. 4,027,094, Cl. 174-48.000.
Phillips, Bobby M., to Eastman Kodak Company. Differentially drafted lofted continuous filament yarn and process for making same. 4,025,994, Cl. 28-72.120.
Phillips, Bobby M., to Eastman Kodak Company. Differentially drafted lofted multi-component continuous filament yarn and process for making same. 4,026,099, Cl. 57-160.000.
Phillips, Michael J.; and Crick, Aubrey M., to International Standard Electric Corporation. Method of terminating optical fibers. 4,026,972, Cl. 264-1.000.
Phillips Petroleum Company: *See—*
Bjornson, Geir, 4,026,930.
Bost, Howard W., 4,026,810.
Farha, Floyd E., Jr.; Johnson, Marvin M.; and Tabler, Donald C., 4,026,820.
Henderson, E. Webb, 4,026,670.
Hutson, Thomas, Jr., 4,026,961.
James, John Preston, 4,026,789.
Seefluth, Charles L., 4,026,984.
Stapp, Paul R., 4,026,924.
Uraneck, Carl A.; and Smith, Richard L., 4,026,865.
Wagner, Paul H.; and Wilt, Mason S., 4,027,067.
Phillips, Raymond M.; and Pease, William J. Water bed mattress. 4,025,975, Cl. 5-370.000.
Photocircuits Division of Kollmorgan Corporation: *See—*
Schneble, Frederick W., Jr., 4,027,055.
Pickering, John Flory, to Girling Limited. Hydraulic reservoirs for vehicle braking systems. 4,026,319, Cl. 137-255.000.
Pickett, Edwin Charles. Exoskeletal structure and methods for its construction. 4,026,077, Cl. 52-80.000.
Pieper, Helmut, to SORG GmbH & Co. Method and apparatus for the indirect heating of glass-carrying passages, feeders and feeder heads. 4,027,091, Cl. 13-6.000.
Piercy, Harry W., to Raymond Lee Organization, Inc., The, a part interest. Building panel placement apparatus. 4,026,519, Cl. 254-2.00R.
Pietryk, Helen C.: *See—*
Hegarty, Charles Paul; and Pietryk, Helen C., 4,027,039.
Pigerol, Charles; Eymard, Pierre; Vernieres, Jean-Claude; and Werbenec, Jean-Pierre, to Labaz. Active derivatives of methylamine, therapeutic compositions containing the same and processes for preparing the said derivatives and compositions. 4,026,925, Cl. 260-501.100.
Piller, Bernhard; Tschopp, Paul; Stauner, Thomas; and Heierli, Walter, to Ciba-Geigy AG. Color photographic recording material. 4,026,709, Cl. 96-100.000.
Pinter, Tihamer: *See—*
Orban, Ferenc; Orban, Maria; Pinter, Tihamer; Zsigmond, Gyorgy; Siklosi, Peter; Solymar, Karoly; Toth, Pal; and Zambo, Janos, 4,026,989.
Pioneer Electronic Corporation: *See—*
Ando, Shizuo; and Shimizu, Terumasa, 4,027,102.

Pitel, Ira Jay, to GTE Sylvania Incorporated. Class ABC amplifier circuit. 4,027,270, Cl. 330-15.000.

Pitney-Bowes, Inc.: *See—*
Bogdanski, John J.; and Silverman, Harold, 4,026,754.
Brown, Michael A.; and Mol, Hans C., 4,026,538.

Pittet, Alan Owen; Klaiber, Erigh Manfred; Vock, Manfred Hugo; Shuster, Edward J.; and Vinals, Joaquin, to International Flavors & Fragrances Inc. 2,6,6-Trimethyl-1-cyclohexen-1-ylacetaldehyde fragrance composition. 4,026,824, Cl. 252-522.000.

Pittman, Walter E.: *See—*
Culhane, Gerald J.; Layton, Gary R.; and Pittman, Walter E., 4,026,668.

Plambeck, H. Robert; and Plambeck, H. Robert, III. Burning logs simulator. 4,026,544, Cl. 272-14.000.

Plambeck, H. Robert, III: *See—*
Plambeck, H. Robert; and Plambeck, H. Robert, III, 4,026,544.

Platus, Daniel H., to United States of America, Air Force. Motion sensor for spinning vehicles. 4,026,498, Cl. 244-3.230.

Player, Michael Antony: *See—*
Siddall, Graham John; and Player, Michael Antony, 4,026,031.

Plessey Handel und Investments A.G.: *See—*
Larner, Douglas Stanley, 4,027,178.
Ring, Arthur Edward, 4,027,180.

Poage, Gloria. Blocking board. 4,026,445, Cl. 223-69.000.

Pohl, Ludwig; Theysohn, Werner; and Unger, Richard, to Merck Patent Gesellschaft mit beschrankter Haftung. Solvents for NMR spectroscopy. 4,026,953, Cl. 260-632.00R.

Pohlmann, Gottfried: *See—*
Heppner, Paul; and Pohlmann, Gottfried, 4,027,112.

Poindexter, Allen M., to United States of America, Energy Research and Development Administration. Liquid-metal dip seal with pneumatic spring. 4,026,763, Cl. 176-87.000.

Poittevin, Andre; Fournex, Robert; and Dagnaux, Michele, to Roussel-UCLAF. Certain thiazole-carboxamides and their pharmaceutical utility. 4,027,030, Cl. 424-270.000.

Policastilla, S/A: *See—*
Palomares, Severiano, 4,026,979.

Polkinghorne, Alan; and Wood, Raymond Frank, to Doublefell Limited. Electronic controls. 4,027,218, Cl. 318-327.000.

Pollermann, Max, to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung. Diaphragm arrangement for adjustable aperture, especially for erecting a radiation beam. 4,027,167, Cl. 250-513.000.

Pollet, Robert Joseph: *See—*
Vanassche, Willy Joseph; Pollet, Robert Joseph; Willems, Jozef Frans; Vandenberghe, Antoon Leon; Berendsen, Jules Robert; and Pattyn, Herman Alberik, 4,026,708.

Polmanteer, Keith E.: *See—*
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Polyakova, Viktoria Petrovna: *See—*
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Polysar Limited: *See—*
Edwards, Douglas Cameron; and Fischer, Erhardt, 4,026,933.

Polysius AG: *See—*
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Poon, Ching C.: *See—*
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Popescu, Corneliu Mircea: *See—*
Gebhardt, Hans; Prahl, Franz; Popescu, Corneliu Mircea; and Schorwerth, Mathias, 4,026,393.

Poppe, Jan Karel August, to U.S. Philips Corporation. Network having a transformer-coupled open-circuit stable negative impedance and a short-circuit stable positive impedance. 4,027,118, Cl. 179-170.00G.

Porod, Robert F., to Western Electric Company, Inc. Apertured belt conveying. 4,027,054, Cl. 427-79.000.

Portal, Charles: *See—*
Ammann, Paul R.; Cook, Glenn M.; and Portal, Charles, 4,026,772.

Portec, Inc.: *See—*
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Porter, Philip: *See—*
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Post Office, The: *See—*
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Potter, James Larry: *See—*
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Powers, Joseph T., to Morrison-Knudsen Company Inc. Electromagnetic lifting and handling device. 4,026,592, Cl. 294-65.500.

Powlesland Engineering Limited: *See—*
Powlesland, William H.; and Smith, James W., 4,027,002.

Powlesland, William H.; and Smith, James W., to Powlesland Engineering Limited. Hydrogen sulphide removal process. 4,027,002, Cl. 423-573.00G.

PPG Industries, Inc.: *See—*
Manner, James A., 4,026,956.
Motsinger, Donald L.; Nalley, Charles E.; and Lovelace, Joe B., 4,027,071.

Prahl, Franz: *See—*
Gebhardt, Hans; Prahl, Franz; Popescu, Corneliu Mircea; and Schorwerth, Mathias, 4,026,393.

Pralus, Michele; Schirmann, Jean-Pierre; and Delavarenne, Serge-Yvon, to Produits Chimiques Ugine Kuhlmann. Catalytic epoxidation process. 4,026,908, Cl. 260-348.50L.

Presto Lock Company, Division of Walter Kidde & Company, Inc.: *See—*
Feinberg, Irving, 4,026,570.

Preston, John; and Cooper, Michael John, to Imperial Chemical Industries Limited. Cinnolin-3-yl carboxylic acids and derivatives. 4,027,023, Cl. 424-250.000.

Prete, Ernest, Jr.; and Knox, Howard T., to Ancra Corporation. Rattle proof anchor fitting for securing loads to a retainer track. 4,026,218, Cl. 105-482.000.

Price, Graham Frederick: *See—*
Coe, Jack; and Price, Graham Frederick, 4,026,454.

Primore Sales, Inc.: *See—*
Kuhn, Edgar D.; Lathrop, Leonard E.; and Sanderson, Robert J., 4,026,122.

Prins, Geert Jan: *See—*
Sunter, Lubbertus; and Prins, Geert Jan, 4,026,038.

Printz, Gerhard; and Haase, Ralf, to Semperit Aktiengesellschaft. Apparatus for butt connection of plies formed of plastic deformable material, especially rubberized steel cord plies. 4,026,753, Cl. 156-502.000.

Procter & Gamble Company, The: *See—*
Hutchins, James P.; and Dobson, Robert D., 4,026,292.
Steen, Howard Robertson; and Trainor, Henry, 4,026,825.

Proctor, James G.: *See—*
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Produits Chimiques Ugine Kuhlmann: *See—*
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Pugh, Jon Francis: *See—*
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Pullman Incorporated: *See—*
Carr, George W., 4,026,596.
van Dijk, Christiaan P., 4,027,000.
Van Hook, James P.; and Yarze, Joseph C., 4,026,823.
Wallace, James Edward, 4,026,791.

Pun, Ching W.; and Poon, Ching C. Leak-resistant dry cells. 4,027,078, Cl. 429-166.000.

Purcupile, John Charles; Lenden, Angela L.; Mutschler, Thomas A.; Kneisley, Joel D.; Wieszczyk, Mark P.; Lasser, Ronald; and Fulmer, Donald W., to Carnegie-Mellon University. Mine roof supporting. 4,026,116, Cl. 61-45.00B.

Pustovar, Vladimir Semenovich: *See—*
Andoniev, Sergei Mikhailovich; Kudinov, Gennady Alexandrovich; Kutsykovich, Dorina Borisovna; Kasyanov, Grigory Ivanovich; Raikovsky, Jury Borisovich; Filipiev, Oleg Vladimirovich; Freidenzon, Evgeny Zakharovich; and Pustovar, Vladimir Semenovich, 4,026,352.

Quinlan, Patrick M.; and McBride, Richard D., to Petrolite Corporation. Alkynoxymethyl amines. 4,026,807, Cl. 260-584.00C.

Quinlan, Patrick M., to Petrolite Corporation. Halogen derivatives of alkynoxymethyl amines. 4,026,946, Cl. 260-584.00C.

Quinn, Edwin J.: *See—*
Dieck, Ronald L.; and Quinn, Edwin J., 4,026,838.
Dieck, Ronald L.; and Quinn, Edwin J., 4,026,839.

Quinnett, Philip E.: *See—*
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Rabe, Douglas C., to United States of America, Air Force. Supersonic spark gap switch. 4,027,187, Cl. 313-217.000.

Rabone, George R., to General Electric Company. Convergent-divergent plug nozzle. 4,026,472, Cl. 239-127.300.

Radelkis Elektrokemial Muszergyarto Szovetkezet: *See—*
Berky, Denes; Damokos, Tamas; Havas, Jeno; and Muller, Henrik, 4,026,774.

Raffensperger, Maurice J.: *See—*
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Raichle, Karl: *See—*
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Raikovsky, Jury Borisovich: *See—*
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Ramey, Harry B. Combination heat absorber and heat storage system. 4,026,270, Cl. 126-271.000.

Ranby, Peter Whitten; and Hobbs, Doreen Yvonne, to Thorn Electrical Industries Limited. Cerium and terbium activated aluminate phosphors. 4,026,816, Cl. 252-301.60R.

Rank Organisation Limited, The: *See—*
Siddall, Graham John; and Player, Michael Antony, 4,026,031.

Ranpak Corporation: *See—*
Ottaviano, Gary W., 4,026,198.

Rantell, Terry Dean: *See—*
Jorro, Michael Anthony Ambrose; Rantell, Terry Dean; and Toswill, Diana Louise, 4,026,998.

Rappaport, Edgar. Electro-optical counting device for counting products arranged in shingle-like fashion. 4,027,155, Cl. 250-222.0PC.

Rappl, Franz: *See—*
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Rasberger, Michael; Rody, Johann; Moser, Paul; and Muller, Helmut,

to Ciba-Geigy Corporation. Nickel stabilizers for synthetic polymers. 4,026,866, Cl. 260-45.75N.
Rasekhi, Houshang, to Addressograph Multigraph Corporation. Charged particle modulator device and improved imaging methods for use thereof. 4,026,700, Cl. 96-1.00R.
Rasmussen, Jerome J. M., to Union Carbide Corporation. Shirred tubular food casings having a barrier coating. 4,026,985, Cl. 264-129.000.
Rasp, Christian: *See*—
Kallfass, Herbert; Rasp, Christian; and Schliebs, Reinhard, 4,026,815.
Raus, Robert W., to Xerox Corporation. Control knob clutches with lock. 4,026,397, Cl. 192-48.100.
Rausch, John J.: *See*—
Van Thyne, Ray J.; and Rausch, John J., 4,026,730.
Rawlings, Dennis George, to Automotive Products Company Limited. Dual friction clutch. 4,026,400, Cl. 192-99.00A.
Ray, Lawrence L.: *See*—
Bonora, Anthony C.; and Ray, Lawrence L., 4,026,574.
Raylar Corporation: *See*—
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Raymond International Inc.: *See*—
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Raymond Lee Organization, Inc., The: *See*—
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Cain, John M., 4,026,416.
Carlton, Joe D., 4,026,559.
Cucalon, Ricardo E., 4,026,626.
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Floyd, Henry G., 4,026,599.
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Lebo, Donald G., 4,026,639.
Patterson, Ray, 4,026,688.
Piercy, Harry W., 4,026,519.
Schultz, Edward J., 4,026,501.
Taylor, Jacob H.; and Taylor, Madge G., 4,026,556.
Raytheon Company: *See*—
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Razgaitis, Frank V.: *See*—
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RCA Corporation: *See*—
Beyers, Billy Wesley, Jr., 4,027,280.
Carnes, James Edward; Dawson, Robert Herman; Fedorka, Robert Thomas; and Kaiser, Henry William, 4,027,260.
Gange, Robert Allen, 4,026,780.
Hanak, Joseph John, 4,027,192.
Kawamoto, Hirohisa; and Miller, David Joseph, III, 4,027,179.
Read, Randol R.: *See*—
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Readey, Dennis W.; Maguire, Edward A., Jr.; and Paladino, Albert E., to Raytheon Company. Microwave dielectrics. 4,026,811, Cl. 252-63.200.
Rebsamen, Arthur, to Maschinenfabrik Schweiter AG. Yarn or thread spooling machine. 4,026,482, Cl. 242-18.100.
Recognition Equipment Incorporated: *See*—
Paup, Robert E.; and Blair, James F., 4,027,142.
Redford, David A., to Texaco Exploration Canada Ltd. In situ gasification of solid hydrocarbon materials in a subterranean formation. 4,026,357, Cl. 166-261.000.
Redlich, Horst: *See*—
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Reed, Raymond E.: *See*—
Reed, Richard E.; and Reed, Raymond E., 4,026,228.
Reed, Richard E.; and Reed, Raymond E., to CAF Industries. Method and apparatus for temporarily converting campers and the like to water-based units. 4,026,228, Cl. 114-61.000.
Regie Nationale des Usines Renault: *See*—
Bourrat, Pierre; Gosset, Paul Xavier; Riss, Pierre; and Vignaud, Jean-Pierre, 4,027,245.
Reiff, Dieter: *See*—
Hoppner, Klaus; Landwehr, Gotz; Wilhelm, Adolf; Meyer, Wolfgang; Frers, Gerd; Lohberg, Rolf; Reiff, Dieter; Forderer, Karl; and Kosiollek, Helmut, 4,026,020.
Reighard, Alan B.: *See*—
Crum, Gerald W.; Nord, Eric T.; Reighard, Alan B.; and Tamny, Simon Z., 4,026,440.
Rein, David A. Aerobic sewerage digestion process (42 C. process). 4,026,793, Cl. 210-12.000.
Reinecke, Erich, to WABCO Westinghouse GmbH. Fluid pressure operated disc brake with piston expansion means to compensate for brake shoe wear. 4,026,391, Cl. 188-71.900.
Reiner, Lawrence L.; and McNett, John P., to Reiner, Lawrence L. Optical illusion-producing rotating toy. 4,026,066, Cl. 46-47.000.
Reisch, Hans; and Giersberg, Dieter, to Siemens Aktiengesellschaft. Method for establishing conference connections in dial-operated telecommunication exchanges. 4,027,098, Cl. 178-3.000.
Reiser, Gerald J.: *See*—
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Reiss, Karl Hans, to Siemens Aktiengesellschaft. Electrophotographic apparatus comprising pre-development charge reducing means. 4,027,158, Cl. 250-315.00R.
Reitlinger, Otto, to United States of America, Navy. Liquid monopropellants of reduced shock sensitivity and explodability. 4,026,739, Cl. 149-88.000.
Reliance Telecommunication Electronics Company: *See*—
Beene, Gerald W., 4,027,224.
Remond, Georges: *See*—
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Renz, Frank G. Transceiver polarity protector. 4,027,223, Cl. 320-26.000.
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Brownlee, Robert R.; Tyers, Frank O.; and Volz, Carl, Sr., 4,026,305.
Reserve Synthetic Fuels, Inc.: *See*—
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Reuschel, Konrad; Schnoeller, Manfred; Muehlbauer, Alfred; Spenke, Eberhard; and Keller, Wolfgang, to Siemens Aktiengesellschaft. Method of producing homogeneously doped n-type Si monocrystals and adjusting dopant concentration therein by thermal neutron radiation. 4,027,051, Cl. 427-35.000.
Reverman, Lawrence Francis, to Miles Laboratories, Inc. Process for the preparation of ketoalkynoic acids and use of the process in an improved synthesis of 2-(substituted)-cyclo-pentane-1,3,4-triones. 4,026,911, Cl. 260-413.000.
Rheinmetall G.m.b.H.: *See*—
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Backstein, Gunter, 4,026,216.
Rhodes, Arthur Neville, to British Aircraft Corporation Limited. Fuel storage means. 4,026,503, Cl. 244-135.00B.
Rhone-Poulenc Industries: *See*—
Bouy, Pierre; de Lachaux, Hubert; and Conan, Michel, 4,026,782.
Costantini, Michel; Dromard, Adrien; and Jouffret, Michel, 4,026,947.
Le Ludec, Joel, 4,026,950.
Rhone-Poulenc S.A.: *See*—
Bourganel, Jack, 4,026,977.
Richard, Jean Paul, to Canadian Industries, Ltd. Stabilized, foamed water gel explosives and method. 4,026,738, Cl. 149-44.000.
Richards, Bernard G.: *See*—
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Richardson, Edwin A.: *See*—
Knapp, Randolph H.; and Richardson, Edwin A., 4,026,361.
Richardson, Howard M. Apparatus for supporting receptacles for transposition. 4,026,026, Cl. 32-22.000.
Richardson, Orland W., to Joseph Skilken & Co. Foldable motor scooter. 4,026,573, Cl. 280-278.000.
Richter, Reinhard H., to Upjohn Company, The. Novel process. 4,026,943, Cl. 260-563.00B.
Ricketts, James R.; Ballantine, Corrine M.; and Reiser, Gerald J., to Marquette Electronics, Inc. Electrode positioning and retaining belt. 4,026,278, Cl. 128-2.06E.
Ricoh Co., Ltd.: *See*—
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Iguchi, Susumu; and Furukawa, Masamichi, 4,027,314.
Kanno, Tadaaki; and Kobayashi, Yuichi, 4,026,647.
Rim, Yong Sung; and Nudenberg, Walter, to Uniroyal Inc. N-(o or p-thiophenyl) substituted polyhalo-5-norbornene-2,3,-dicarboximide flame retardants and polymers containing said imides. 4,026,963, Cl. 260-859.00R.
Ring, Arthur Edward, to Plessey Handel und Investments A.G. Integrated circuit transistor arrangement having a low charge storage period. 4,027,180, Cl. 307-303.000.
Ripa, Rodolfo; and Garcia, Alberto, to Universidad Tecnia Federico Santa Maria. Method of partially converting wood into a lignin plastic polymer. 4,026,847, Cl. 260-17.200.
Risman, Per Olov G: *See*—
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Riss, Pierre: *See*—
Bourrat, Pierre; Gosset, Paul Xavier; Riss, Pierre; and Vignaud, Jean-Pierre, 4,027,245.
Ritzerfeld, Gerhard. Electrostatic or xerographic copying or duplicating machine. 4,026,646, Cl. 355-7.000.
Rivers, James R. Metal recovery unit. 4,026,784, Cl. 204-273.000.
Robbins, Dean, to Chem. Pure West, Inc. Sludge incinerator. 4,026,223, Cl. 110-7.00B.
Robbins, Roy F., to Ernster, Louis G. Water ski locating device. 4,026,236, Cl. 116-124.00R.
Robers, Felix Franz: *See*—
Appelhans, Antonius Friedrich; Robers, Felix Franz; and Stemick, Ulrich, 4,026,749.
Roberts, Charles Chester, Jr., to Bell Telephone Laboratories, Incorporated. Heat pipe switch. 4,026,348, Cl. 165-32.000.
Roberts, Michael G., to Owens-Corning Fiberglas Corporation. Unsaturated polyester with thermoplastic grafts using calcium hydroxide as gelling agent. 4,026,965, Cl. 260-862.000.
Robertshaw Controls Company: *See*—
Newell, Dennis E., 4,027,221.
Tyler, Hugh J.; and Newell, Dennis E., 4,027,202.

Robertson, Elton: *See—*
Bown, Eric B.; Mueller, Harold P., III; and Robertson, Elton, 4,026,645.

Robinet, McLouis, to United States of America, Energy Research and Development Administration. X-ray source safety shutter. 4,027,156, Cl. 250-275.000.

Robust, Randy R. Splash guard for bathtubs. 4,025,970, Cl. 4-173.00R.

Rochlitz, Jurgen; and Lehner, Richard, to Hoechst Aktiengesellschaft. Electrophotographic recording material. 4,026,704, Cl. 96-1.500.

Rockwell International Corporation: *See—*
Schack, Carl J., 4,026,996.

Rody, Johann: *See—*
Rasberger, Michael; Rody, Johann; Moser, Paul; and Muller, Helmut, 4,026,866.

Roeder, George K. Hydraulically operated sucker rod pumping system. 4,026,661, Cl. 417-53.000.

Roeder, George K. Burglar alarm improvements. 4,027,103, Cl. 179-5.00R.

Rohde, Heinz K.: *See—*
Cohn, Arnold S.; Rohde, Heinz K.; and Koehler, Albert M., 4,026,227.

Rohm, Gunter Horst. Power-driven wedge-activated chucks. 4,026,566, Cl. 279-121.000.

Rohm and Haas Company: *See—*
Smiley, Leonard H., 4,026,828.
Yarnell, Peter A., 4,026,987.

Rohrbach, William R.: *See—*
Knauer, Ralph H.; and Rohrbach, William R., 4,026,474.

Roiko, Russell A.; and Throne, James D., to Minnesota Mining and Manufacturing Company. Universal connector. 4,026,625, Cl. 339-99.00R.

Roman, Gary W. Trigger release mechanism. 4,026,056, Cl. 42-69.00R.

Ronk, Gary M.: *See—*
Kim, Yung K.; Lee, Chi-Long; and Ronk, Gary M., 4,026,845.
Kittle, Ronald E.; and Ronk, Gary M., 4,026,844.
Lee, Chi-Long; and Ronk, Gary M., 4,026,835.
Lee, Chi-Long; and Ronk, Gary M., 4,026,842.

Root, Glenn M.; Root, Ronald G.; and Root, Richard A., to G.M. Root, Inc. Apparatus for, and method of, cleaning a selected surface portion of the interior liner of a tire. 4,025,981, Cl. 15-21.00R.

Root, Richard A.: *See—*
Root, Glenn M.; Root, Ronald G.; and Root, Richard A., 4,025,981.

Root, Ronald G.: *See—*
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Rosenthal, Lawrence David. Vector generator. 4,027,148, Cl. 235-198.000.

Roskelley, Thomas J. Gas dehydrator process. 4,026,681, Cl. 55-32.000.

Rossler, Peter: *See—*
Siegle, Peter; Sasse, Klaus; and Rossler, Peter, 4,027,037.

Roth, Walter L.: *See—*
Farrington, Gregory C.; and Roth, Walter L., 4,027,076.

Rothfuss, Robert G.; Stone, Russell C.; and Wykoff, Matthew H., to Senco Products, Inc. Surgical staple extractor. 4,026,520, Cl. 254-28.000.

Roto-Finish Company: *See—*
Balz, Gunther W., 4,026,075.

Rotobind Ltd.: *See—*
Merzagora, Frank, 4,026,210.

Rousseau, Roy Settle, to Kartridg Pak Co., The. Apparatus for removing meat from trimmed bone fragments. 4,025,985, Cl. 17-1.00G.

Roussel-UCLAF: *See—*
Deraedt, Roger; Marchandeau, Christian; and Meier, Jean, 4,027,040.
Poittevin, Andre; Fournex, Robert; and Dagnaux, Michele, 4,027,030.

Rozek, Ivan E., to Portec, Inc. Control device for a synchronous motor. 4,027,216, Cl. 318-176.000.

Ruben, Murray A.: *See—*
Fowler, Hugh; Ruben, Murray A.; Dumais, Richard L.; and Collings, Robert F., 4,027,140.

Rubin, Raymond. Portable and collapsible sitz bath receptacle. 4,025,966, Cl. 4-6.000.

Rubinchik, Faitel Markovich: *See—*
Kaluzhsky, Nikolai Andreevich; Rubinchik, Faitel Markovich; Nasyrov, Gakif Zakirovich; Kaim, German Abramovich; Averin, Vitaly Mikhailovich; Milrud, Savely Mikhailovich; Telyatnikov, Garry Vladimirovich; Lyakhov, Viktor Prokhorovich; Abramova, Ljudmila Nikolaevna; Tarasov, Vladimir Ivanovich; Denisov, Vladislav Mikhailovich; Nasyrov, Dinam Latypovich; Stolyar, Boris Alexandrovich; Tagiev, Muzafar Suleiman-ogly; Lagno, Vladimir Ivanovich; and Kostin, Vladimir Nikolaevich, 4,026,672.

Rudiger, Gunther: *See—*
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Rudolph, Kendall Jay: *See—*
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Ruf, Peter: *See—*
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Rumell, James A. Method of unloading container from transport vehicle. 4,026,429, Cl. 214-152.000.

Russ, James Frederick: *See—*
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Russell, Charles R.: *See—*
Bagley, Edward B.; Fanta, George F.; Doane, William M.; Gugliemelli, Lewis A.; and Russell, Charles R., 4,026,849.

Russell, Edward A.; Knipe, Richard L.; and Leaver, James E., to Kaiser Aluminum & Chemical Corporation. Electrocoating bath temperature control. 4,026,775, Cl. 204-181.000.

Russo, Leonard. Apparatus for dissolving and dispensing fertilizer to either of two water streams of different pressure. 4,026,673, Cl. 23-272.0AH.

Russo, Manuel A.: *See—*
Abrahams, Louis; and Russo, Manuel A., 4,026,803.

Ruthardt, Rolf: *See—*
Kummer, Franz; Mai, Gerhard; Ruthardt, Rolf; and Thiede, Horst, 4,027,326.

Ruthner Industrieanlagen Aktiengasellschaft: *See—*
Zaremski, Donald R.; and Krepler, Albert, 4,026,777.

Rye, Ralph K. Upholstered seating system. 4,026,567, Cl. 297-445.000.

S. C. Johnson & Son, Inc.: *See—*
Billman, Fred L.; and Lee, Hung-Hee H., 4,026,915.

S&S Corrugated Paper Machinery Co., Inc.: *See—*
Adams, David; and Smiltneck, Raimond J., 4,026,199.
Weiskopf, Gunther, 4,026,176.

Saab-Scania Aktiebolag: *See—*
Engstrom, Bengt Lars Olof, 4,026,110.

Saad, Hosny Younes, to American Cyanamid Company. Use of chitin derivatives in automobile products. 4,027,068, Cl. 428-426.000.

Sada, Tomohiko: *See—*
Fujiwara, Yoshio; Naito, Keiichi; Fujimoto, Yoshinobu; Odashima, Tooru; and Sada, Tomohiko, 4,027,063.

Sagami Chemical Research Center: *See—*
Saito, Tomo; Watanabe, Kazuo; and Morikawa, Naotake, 4,027,163.

Sahara, Hiroshi; and Nagai, Tamiji, to Sony Corporation. High voltage generating circuit. 4,027,200, Cl. 315-411.000.

Saida, Kenichi; Sakai, Masahiko; and Narahara, Toshikazu, to Hitachi, Ltd. Epoxy resin compositions. 4,026,872, Cl. 260-59.00R.

Saito, Tetsuo: *See—*
Kobatake, Takashi; Takeda, Kyosuke; Nishide, Sadao; and Saito, Tetsuo, 4,026,095.

Saito, Tomo; Watanabe, Kazuo; and Morikawa, Naotake, to Sagami Chemical Research Center. Method of compensating for quenching effect of substance contained in a sample gas the radioactivity of which is to be measured by a radioactivity detector and apparatus for performing the same. 4,027,163, Cl. 250-363.00R.

Sakai, Masahiko: *See—*
Saida, Kenichi; Sakai, Masahiko; and Narahara, Toshikazu, 4,026,872.

Sakurai, Hisaya: *See—*
Aishima, Itsuho; Sakurai, Hisaya; Takashi, Yukichi; Morita, Hideo; Ikegami, Tadashi; and Sato, Toshio, 4,027,089.

Salick, Ralph A. Bird feeder. 4,026,244, Cl. 119-51.00R.

Salvia-Werk Gesellschaft m.b.H.: *See—*
Betzler, Hermann, 4,026,463.

Sam Stein Associates, Inc.: *See—*
Fetzer, Fred, 4,026,201.

Sambucetti, Carlos Juan; and Mitchell, Joseph William, to International Business Machines Corporation. Water based magnetic inks and the manufacture thereof. 4,026,713, Cl. 106-19.000.

Sample, Thomas E., Jr.; Hughes, James W.; and Tate, Jack F., to Texaco Inc. Scale control. 4,026,874, Cl. 260-77.5MA.

Samura, Tetsuya; Ishikawa, Isao; and Nagata, Kozaburo, to Sanyo Chemical Industries, Ltd. Flexible polyurethane foam. 4,026,829, Cl. 260-2.5AP.

Sanders Associates, Inc.: *See—*
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Sanderson, Robert J.: *See—*
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Sandoz Ltd.: *See—*
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Santini, Thomas Francis: *See—*
Langere, Ronald Francis; Loeffler, Otto Ernest; and Santini, Thomas Francis, 4,026,819.

Santucci, Michael Charles, to Babcock & Wilcox Company, The. Industrial technique. 4,026,419, Cl. 214-1.00H.

Sanyo Chemical Industries, Ltd.: *See—*
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Sanyo Electric Co., Ltd.: *See—*
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Sarley, John F., to Litton Industrial Products, Inc. Pilfer-proof display. 4,026,415, Cl. 211-4.000.

Sasaki, Hiroki: *See—*
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Sasse, Klaus: *See—*
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Sasur, Stanley. Combination rake and ground cover retaining device. 4,026,094, Cl. 56-400.040.

Sato, Eiichi, to Olympus Optical Co., Ltd. Method for producing an image dissector. 4,026,693, Cl. 65-31.000.

Sato, Haruhiko: *See—*
Nakamura, Shinichi; Ishikawa, Hidehiko; Mogaki, Katsuo; Sato, Mikio; Sato, Shui; Taguchi, Masahiko; and Sato, Haruhiko, 4,026,706.

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Sato, Mikio: *See—*
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Sato, Shui: *See—*
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Sato, Takashi: *See—*
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Sato, Toshio: *See—*
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Sato, Yo. Portable labelling machine. 4,026,758, Cl. 156-540.000.
Sato, Zenkei, to Giko Kabushiki Kaisha. Push button switch. 4,027,129, Cl. 200-159.00A.
Satoh, Akihiro; Konotsune, Shiro; Kachi, Atsuyuki; and Shimizu, Hiroshi, to Chisso Corporation. Method for producing ethylene polymers. 4,027,087, Cl. 526-114.000.
Saucy, Gabriel: *See—*
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Saunders, Roger I.: *See—*
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Saunders, William T., to National Steel Corporation. Facilitating removal of deep drawn sheet metal can bodies from female die structure. 4,026,140, Cl. 72-344.000.
Saveker, David R. Sinusoidal structural element. 4,025,996, Cl. 428-594.000.
Savitsky, Evgeny Mikhailovich: *See—*
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Sawyer, Jimmy D.: *See—*
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Sayles, David C., to United States of America, Army. Carboranyldiferrocenylmethyl perchlorate. 4,026,912, Cl. 260-439.0CY.
Scapa-Porritt Limited: *See—*
Lees, David Logan; and Wild, Colin Alfred, 4,026,331.
Schaap, Robert E. Cowl for an industrial electric truck. 4,026,349, Cl. 165-41.000.
Schack, Carl J., to Rockwell International Corporation. Synthesis of nitryl perchlorate. 4,026,996, Cl. 423-386.000.
Schade, Fritz; Strocker, Gunter; and Fischer, Gerhard, to Gustav Schade Maschinenfabrik. Apparatus for extracting bulk material from dumps. 4,026,423, Cl. 214-10.000.
Schaeffer, Howard John, to Burroughs Wellcome Co. 8-Azapurine derivatives. 4,027,025, Cl. 424-251.000.
Schafer, Otmar U. Method and apparatus for the alternate heating and cooling of a heat exchanger of a heating and cooling system. 4,026,347, Cl. 165-2.000.
Schaffer, Max A.: *See—*
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Scharfe, Gerhard; Wenzel, Rupert; and Biedermann, Wolfgang, to Bayer Aktiengesellschaft. Process for removing 1,4-naphthoquinone from phthalic anhydride. 4,026,770, Cl. 203-29.000.
Scharrer, Hans Wilhelm. Data-indicating device. 4,026,051, Cl. 40-113.000.
Schaufele, Robert F.; and Brown, Felix H. Phosphor geometry for color displays from a multiple gaseous discharge display/memory panel. 4,027,191, Cl. 313-487.000.
Scheinpflug, Hans: *See—*
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Schlegel, Paul D., to Gates Rubber Company, The. Windshield wiper squeegee. 4,025,983, Cl. 15-250.360.
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Schmid, August, to Patentverwertungs-und Finanzierungsgesellschaft Serania AG. Bowling alley bowling ball shock absorber mechanism. 4,026,552, Cl. 273-49.000.
Schmidt, Ference J., to Ametek, Inc. Solar collector coating. 4,026,271, Cl. 126-271.000.
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Schneble, Frederick W., Jr., to Photocircuits Division of Kollmorgan Corporation. Process of tin plating by immersion. 4,027,055, Cl. 427-98.000.
Schneider, Siegfried; Weis, Wolfgang; Beyl, Volker; and Niederprum, Hans, to Bayer Aktiengesellschaft. Process for the production of ammonium fluoride from fluosilicic acid. 4,026,997, Cl. 423-470.000.
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Schriber, Stanley O., to Atomic Energy of Canada Limited. Klystron-resonant cavity accelerator system. 4,027,193, Cl. 315-5.410.
Schroeder, Jack J.; and Appleman, Milo D., to Schroeder, Jack J. Solid animal feed supplement. 4,027,043, Cl. 426-69.000.
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Scragg, Robert L.; and Parker, Alfred B. Solar reactor engine. 4,026,112, Cl. 60-641.000.
Scroggins, Henry L. Twisting and bending machine for elongated metallic strips. 4,026,137, Cl. 72-299.000.
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Senter, Jonas, to CITC Industries, Inc. Article of footwear and method of making same. 4,026,044, Cl. 36-14.000.
Sessa, Terenzio. Window regulators, especially for vehicle windows. 4,026,071, Cl. 49-352.000.
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Shaughnessy, Frank J., to Stanley Works, The. Transmitter for a coded electronic security system. 4,027,276, Cl. 325-141.000.
Shaw, Richard Horace, to United Technologies Corporation. Electrolyte for electrochemically machining nickel base superalloys. 4,026,779, Cl. 204-129.750.
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Sherman, Clarence A. Tilting cab control apparatus. 4,026,113, Cl. 60-477.000.
Shevchenko, Dmytro, to Catalyst Research Corporation. Method of making thermal batteries and batteries, having V_2O_5 electrode. 4,027,077, Cl. 429-112.000.
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Shiga, Shujiro; Katsumata, Takeshi; Inaba, Eiji; Okamoto, Yasushi; Inmaru, Atsushi; Nishioka, Tsugio; Nakata, Takashi; and Takaki, Seiji, to Sumitomo Chemical Company, Limited. Method for removing nitrogen oxides from combustion exhaust gases. 4,026,992, Cl. 423-239.000.
Shigehara, Katsumi. Device for attaching leads to a transformer or the like. 4,027,279, Cl. 336-90.000.
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Shumaker, John F., to J. I. Case Company. Stabilizer attachment for material handling implement. 4,026,428, Cl. 214-138.00R.
Shupe, Robert N.; and Haines, David C. Knock-down table and foldable supporting structure therefor. 4,026,219, Cl. 108-62.000.
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Siddall, Graham John; and Player, Michael Antony, to Rank Organisation Limited, The. Surface measurement instruments. 4,026,031, Cl. 33-174.00L.
Siegele, John C.: *See*—
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Silverstolpe, Marianne; and Silverstolpe, Lennart. Belt with adjustable back support plate. 4,026,547, Cl. 272-109.000.
Silverwater, Bernard F., to Pall Corporation. Magnetic pressure indicator with sampling ports. 4,026,153, Cl. 73-421.50R.
Silvey, Elmer R. Fluid operated ram for felling trees. 4,026,524, Cl. 254-93.00R.
Simic, Milutin, to Chevron Research Company. Sulfur composition with mica. 4,026,719, Cl. 106-287.0SC.
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Straw, Raymond L., to Caterpillar Tractor Co. Method of manufacturing an open-celled ceramic article. 4,026,746, Cl. 156-155.000.
Streeter, Robert D.; and Mohr, John G., to Magnavox Company, The. Reducing teleprinter errors caused by primary power frequency variations. 4,027,099, Cl. 178-23.00R.
Streim, Edward H.; and Strasser, Thomas, to Monet Jewelers, Inc. Display stand. 4,026,417, Cl. 211-163.000.
Strickle, Erich: *See—*
Cordes, Claus; Strickle, Erich; Zendath, Josef; and Simon, Georg Nikolaus, 4,026,834.
Strickler, Hugo: *See—*
Becker, Joseph J.; Schulte-Elte, Karl-Heinrich; Strickler, Hugo; and Ohloff, Gunther, 4,026,948.
Strocker, Gunter: *See—*
Schade, Fritz; Strocker, Gunter; and Fischer, Gerhard, 4,026,423.
Stuart, William I., to Springs Mills, Inc. Doff and start-up control apparatus for textile yarn processing machine. 4,026,096, Cl. 57-54.000.
Studer, Philip A., to United States of America, National Aeronautics and Space Administration. Three phase full wave DC motor decoder. 4,027,212, Cl. 318-138.000.
Studtmann, George Henry, to Borg-Warner Corporation. Bipolar inverter with induction generator. 4,027,226, Cl. 321-47.000.
Stumpp & Schule KG: *See—*
Theimer, Hubert, 4,027,139.
Subrizi, Angelo; and Violino, Ettore, to Ing. C. Olivetti & C., S.p.A. Peripherals interrupt control unit. 4,027,290, Cl. 340-172.500.

Suchy, Milos: *See—*
Chodnekar, Madhukar Subraya; Loeliger, Peter; Schwieter, Ulrich; Pfiffner, Albert; Suchy, Milos; and Zurfluh, Rene, 4,027,033.

Sugimoto, Kazuyasu; Yamaya, Hiroshi; and Ishimoto, Kameki, to Matsushita Electric Industrial Co., Ltd. Method of making connector assembly for printed wiring board. 4,026,014, Cl. 29-629.000.

Sugimoto, Keiichi; Nishijima, Koji; Akimoto, Hiroshi; Hanaoka, Tadashi; and Kakeya, Nobuharu, to Takeda Chemical Industries, Ltd. Process for producing alpha-sulfophenylacetic acid derivatives. 4,026,940, Cl. 260-456.00P.

Sugita, Kiyo. Printed cloth. 4,025,963, Cl. 2-243.00B.

Sugiyama, Iwao: *See—*
Kageyama, Kunio; Hirakawa, Hiroshi; Ozaki, Masatake; Sugiyama, Iwao; Iwakura, Mitsuharu; and Someya, Yoshiaki, 4,026,877.
Kageyama, Kunio; Hirakawa, Hiroshi; Ozaki, Masatake; Sugiyama, Iwao; Iwakura, Mitsuharu; and Someya, Yoshiaki, 4,026,878.

Sulser, Ueli: *See—*
Leu, Gerhard; Sulser, Ueli; Widmer, Jurg; and Goeth, Heinz, 4,026,875.

Sumitomo Chemical Company, Limited: *See—*
Shiga, Shujiro; Katsumata, Takeshi; Inaba, Eiji; Okamoto, Yasushi; Inmaru, Atsushi; Nishioka, Tsugio; Nakata, Takashi; and Takaki, Seiji, 4,026,992.

Sumner, Joe D.; and Stanley, Carlton H. Pressure enhanced butterfly valve. 4,026,514, Cl. 251-152.000.

Sun Oil Company of Pennsylvania: *See—*
Mayer, Robert, 4,027,301.

Sundin, Bertil Waldemar: *See—*
Noren, Carl Anders; and Sundin, Bertil Waldemar, 4,026,192.

Sundstrand Corporation: *See—*
Blomquist, Robert E., 4,026,191.

Sunter, Lubbertus; and Prins, Geert Jan, to Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek Ten Behoeve Van Nijverheid, Handel en Verkeer. Ship's maneuvering simulator. 4,026,038, Cl. 35-10.200.

Superior Electric Company, The: *See—*
Leenhouts, Albert C., 4,027,222.

Supernaw, John W.: *See—*
Greve, Gordon M.; Hadley, Charles F.; Read, Randol R.; and Supernaw, John W., 4,027,281.

Surface Technology Corporation: *See—*
Van Thyne, Ray J.; and Rausch, John J., 4,026,730.

Suris, Robert Arnoldovich: *See—*
Berezin, Gennady Nikolaevich; Gurzheev, Valery Nikolaevich; Zakharov, Vladimir Ivanovich; Nikitin, Arkady Viktorovich; and Suris, Robert Arnoldovich, 4,026,743.

Sutula, Raymond A., to United States of America, Navy. Battery electrolyte. 4,026,725, Cl. 429-52.000.

Sutures, Inc.: *See—*
Esemplare, Pascal E.; and Beeferman, Dennis, 4,027,060.

Suzuki, Akihiko: *See—*
Takematsu, Hikaru; and Suzuki, Akihiko, 4,027,110.

Sweatt, Warren L.: *See—*
Diakantonis, Tony; and Sweatt, Warren L., 4,027,304.

Szabo, Marton J., to P.H.C. Industries, Inc. Sheathed soft-feel handle with concealed lapped ends and method of making same. 4,026,750, Cl. 156-273.000.

Szavik, Laszlo: *See—*
Knoll, Jozsef; Furst, Zsuzsanna; Meszaros, Zoltan; Szentmiklosi, Peter; David, Agoston; Hermecz, Istvan; Mandi, Attila; Bognar, Rezso; Makleit, Sandor; Valovics, Gyula; Szavik, Laszlo; and Nagy, Sandor, 4,027,024.

Szentmiklosi, Peter: *See—*
Knoll, Jozsef; Furst, Zsuzsanna; Meszaros, Zoltan; Szentmiklosi, Peter; David, Agoston; Hermecz, Istvan; Mandi, Attila; Bognar, Rezso; Makleit, Sandor; Valovics, Gyula; Szavik, Laszlo; and Nagy, Sandor, 4,027,024.

Szinai, Stephen S.: *See—*
Cashin, Colin H.; Chakrabarti, Jiban K.; and Szinai, Stephen S., 4,027,035.

Szpur, Roman. Apparatus for automatically producing waffles and similar food articles. 4,026,202, Cl. 99-355.000.

T.A. Pelsue Company: *See—*
Beavers, Allan E., 4,026,312.

Tabler, Donald C.: *See—*
Farha, Floyd E., Jr.; Johnson, Marvin M.; and Tabler, Donald C., 4,026,820.

Tagiev, Muzafar Suleiman-ogly: *See—*
Kaluzhsky, Nikolai Andreevich; Rubinchik, Faitel Markovich; Nasyrov, Gakif Zakirovich; Kaim, German Abramovich; Averin, Vitaly Mikhailovich; Milrud, Savely Mikhailovich; Telyatnikov, Garry Vladimirovich; Lyakhov, Viktor Prokhorovich; Abramova, Ljudmila Nikolaevna; Tarasov, Vladimir Ivanovich; Denisov, Vladislav Mikhailovich; Nasyrov, Dinam Latypovich; Stolyar, Boris Alexandrovich; Tagiev, Muzafar Suleiman-ogly; Lagno, Vladimir Ivanovich; and Kostin, Vladimir Nikolaevich, 4,026,672.

Taguchi, Kenichi; Yamamoto, Akira; and Ishihara, Toshinobu, to Shin-Etsu Chemical Company Limited. Method for preparing hexyn-3-ol-1. 4,026,954, Cl. 260-632.00B.

Taguchi, Masahiko: *See—*
Nakamura, Shinichi; Ishikawa, Hidehiko; Mogaki, Katsuo; Sato, Mikio; Sato, Shui; Taguchi, Masahiko; and Sato, Haruhiko, 4,026,706.

Taihei Kogyo Co., Ltd.: *See—*
Kutaguchi, Katuhiko, 4,026,600.

Takada, Hiroshi; and Kawada, Yasuo, to Kabushiki Kaisha Komatsu Seisakusho. Pilot head for laying pipes in the ground. 4,026,371, Cl. 175-45.000.

Takahari, Tomoo; Kondo, Shiyuichi; Sone, Nobumasa; Hashimoto, Kengi; and Ishiguro, Tadashi, to Nippon Steel Corporation. Method for coloring a stainless steel. 4,026,737, Cl. 148-6.14R.

Takahashi, Shinichiro: *See—*
Tazaki, Teruo; Takahashi, Shinichiro; Shimozu, Teruyasu; and Fujimoto, Kazumi, 4,026,615.

Takahashi, Teizo: *See—*
Toyokuni, Kazuo; Yamada, Shunzo; Takahashi, Teizo; Nakamura, Hajime; Nobutomo, Kazunari; and Kawakami, Shinji, 4,026,124.

Takahashi, Toru, to Canon Kabushiki Kaisha. Cleaning device for use in electrophotographic copying apparatus. 4,026,648, Cl. 355-15.000.

Takai, Makoto: *See—*
Moriya, Masafumi; Hosoda, Kazuo; and Takai, Makoto, 4,026,831.

Takaki, Seiji: *See—*
Shiga, Shujiro; Katsumata, Takeshi; Inaba, Eiji; Okamoto, Yasushi; Inmaru, Atsushi; Nishioka, Tsugio; Nakata, Takashi; and Takaki, Seiji, 4,026,992.

Takamune, Hirotoki: *See—*
Ichikawa, Shingo; Kashima, Yoshinobu; and Takamune, Hirotoki, 4,026,103.

Takano, Mitsuo: *See—*
Okamoto, Hiroshige; Watanabe, Shiro; Yuasa, Katsumi; Takano, Mitsuo; Fukinbara, Itaru; and Yano, Nobumitsu, 4,026,795.

Takashi, Yukichi: *See—*
Aishima, Itsuho; Sakurai, Hisaya; Takashi, Yukichi; Morita, Hideo; Ikegami, Tadashi; and Sato, Toshio, 4,027,089.

Takata, Toshihiro; Kawakatsu, Yoshifumi; and Nohara, Keitsugu, to Toho Beslon Kabushiki Kaisha. Process for the preparation of methallyl sulfonic acid and its salts. 4,026,926, Cl. 260-513.00T.

Takayanagi, Eiichi: *See—*
Arakawa, Osamu; Sekiguchi, Tadaaki; and Takayanagi, Eiichi, 4,027,134.

Takebe, Kaoru; and Utsumi, Tetsuya, to Minolta Camera Kabushiki Kaisha. Magnetic brush developing device for use in electrophotographic copying apparatus. 4,026,241, Cl. 118-653.000.

Takeda Chemical Industries, Ltd.: *See—*
Sugimoto, Keiichi; Nishijima, Koji; Akimoto, Hiroshi; Hanaoka, Tadashi; and Kakeya, Nobuharu, 4,026,940.

Takeda, Kyosuke: *See—*
Kobatake, Takashi; Takeda, Kyosuke; Nishide, Sadao; and Saito, Tetsuo, 4,026,095.

Takeda, Toshio: *See—*
Tomisawa, Norio; Uchiyama, Yasuji; Okumura, Takatoshi; and Takeda, Toshio, 4,026,180.

Takematsu, Hikaru; and Suzuki, Akihiko, to Iwasaki Tsushinki Kabushiki Kaisha. Key telephone system. 4,027,110, Cl. 179-99.000.

Takemura, Takehide, to Matsushita Electric Industrial Co., Ltd. Electronic multi-channel selection switch with common new-selection sensing device. 4,027,230, Cl. 323-79.000.

Takemura, Takehide: *See—*
Minami, Shunji; Takemura, Takehide; and Oka, Shunzo, 4,027,244.

Tallant, James L., to Halliburton Company. Natural gas thermal extraction process and apparatus. 4,026,120, Cl. 62-5.000.

Tamada, Shigeharu: *See—*
Nakagawa, Kazuyuki; Yoshizaki, Shiro; Tanimura, Kaoru; and Tamada, Shigeharu, 4,026,897.

Tamai, Yoshin: *See—*
Nishida, Takashi; Ninagawa, Yoichi; Itoi, Kazuo; Omura, Yoshiaki; Tamai, Yoshin; Hosogai, Takeo; and Fujita, Yoshiji, 4,026,960.

Tamaru, Munetaka: *See—*
Kume, Kazunari; Watanabe, Minoru; Oono, Hideshi; and Tamaru, Munetaka, 4,026,100.

Tamazawa, Tsuyoshi; and Kunugi, Takashi, to Nissan Motor Co., Ltd. Overheat protection device for a catalytic converter. 4,026,106, Cl. 60-277.000.

Tamny, Simon Z.: *See—*
Crum, Gerald W.; Nord, Eric T.; Reighard, Alan B.; and Tamny, Simon Z., 4,026,440.

Tamura, Toshinari: *See—*
Murakami, Masuo; Inukai, Noriyoshi; Iwamoto, Hidenori; Tamura, Toshinari; Yanagisawa, Isao; Hasegawa, Osamu; Ishii, Yoshio; Matsuda, Hideya; Shiozaki, Tetsuya; and Tomioka, Kenichi, 4,026,927.

Tanaka, Akira, to American Safety Equipment Corporation. Safety belt tension reducing means. 4,026,494, Cl. 242-107.000.

Tanaka, Atsuyuki; and Oyabu, Masaaki, to Minolta Camera Kabushiki Kaisha. Identification card issuing apparatus. 4,026,642, Cl. 355-1.000.

Tanaka, Masayoshi, to Tsudakoma Kogyo Kabushiki Kaisha. Apparatus for controlling temperature on a drying machine for running yarn sheets. 4,026,036, Cl. 34-54.000.

Tanaka, Nobuo: *See—*
Nakaoka, Kazuhide; Araki, Kenji; Shimomura, Takayoshi; Kubotera, Haruo; Osaka, Shinobu; Tanaka, Nobuo; Kuroda, Hiroshi; and Kurihara, Takao, 4,026,729.

Tanaka, Satoru; and Watanabe, Hideaki, to Eisai Co., Ltd. 1,3-Benzodioxol derivatives. 4,026,895, Cl. 260-268.0TR.

Tang, Donald T., to International Business Machines Corporation. Resynchronizable bubble memory. 4,027,283, Cl. 340-146.10D.

Tanigaichi, Mineaki; Gaku, Morio; Ohya, Kazuyuki; Motoori, Susumu; and Noguchi, Kazuo, to Mitsubishi Gas Chemical Co., Ltd. Cyanic acid esters of aromatic polycarbonates. 4,026,913, Cl. 260-463.000.

Tanimura, Kaoru: *See—*
Nakagawa, Kazuyuki; Yoshizaki, Shiro; Tanimura, Kaoru; and Tamada, Shigeharu, 4,026,897.

Tanney, John W., to Canadian Patents and Development Limited. Apparatus for measuring the velocity of a fluid. 4,026,149, Cl. 73-194.00R.

Tarasov, Vladimir Ivanovich: *See—*
Kaluzhsky, Nikolai Andreevich; Rubinchik, Faitel Markovich; Nasyrov, Gakif Zakirovich; Kaim, German Abramovich; Averin, Vitaly Mikhailovich; Milrud, Savely Mikhailovich; Telyatnikov, Garry Vladimirovich; Lyakhov, Viktor Prokhorovich; Abramova, Ljudmila Nikolaevna; Tarasov, Vladimir Ivanovich; Denisov, Vladislav Mikhailovich; Nasyrov, Dinam Latypovich; Stolyar, Boris Alexandrovich; Tagiev, Muzafar Suleiman-ogly; Lagno, Vladimir Ivanovich; and Kostin, Vladimir Nikolaevich, 4,026,672.

Tashiro, Makoto; Hirahara, Keijiro; Yahata, Akihiro; and Ohyama, Masanobu, to Tokyo Shibaura Electric Co., Ltd. Method for manufacturing gallium phosphide. 4,026,994, Cl. 423-299.000.

Tate, Jack F.: *See—*
Sample, Thomas E., Jr.; Hughes, James W.; and Tate, Jack F., 4,026,874.

Taylor Diving & Salvage Co., Inc.: *See—*
Banjavich, Mark P.; and Gaudiano, Anthony V., 4,026,283.

Taylor, Jacob H.; and Taylor, Madge G., to Raymond Lee Organization, Inc., The, a part interest. Game apparatus employing balls and frame. 4,026,556, Cl. 273-123.00R.

Taylor, Lawrence Huntington. Food product and method for preparing same. 4,027,044, Cl. 426-134.000.

Taylor, Madge G.: *See—*
Taylor, Jacob H.; and Taylor, Madge G., 4,026,556.

Taylor, Murland L. Automatic sampling apparatus. 4,026,152, Cl. 73-421.00R.

Taylor, Robert Gordon, to USM Corporation. Sheet metal collet. 4,027,136, Cl. 219-98.000.

Taylor, Theodore E.: *See—*
Stackhouse, Bill L.; and Taylor, Theodore E., 4,027,243.

Tazaki, Teruo; Takahashi, Shinichiro; Shimozu, Teruyasu; and Fujimoto, Kazumi, to Sony Corporation. Container for magnetic tape cassette. 4,026,615, Cl. 312-12.000.

TED-Bildplatten Aktiengesellschaft, AEG-Telefunken, TELDEC: *See—*
Maslowski, Stefan; Huber, Peter; and Redlich, Horst, 4,027,330.

Teijin Limited: *See—*
Shima, Takeo; Yamashiro, Seiichi; Yoshimura, Masao; Kobayashi, Takayuki; Kuratsuji, Takatoshi; and Inata, Hiroo, 4,026,973.

Tekulve, Daniel R.: *See—*
Adams, James S.; Peck, William H.; and Tekulve, Daniel R., 4,025,972.

Telautograph Corporation: *See—*
Ambrosio, Biagio F., 4,027,311.

Telyatnikov, Garry Vladimirovich: *See—*
Kaluzhsky, Nikolai Andreevich; Rubinchik, Faitel Markovich; Nasyrov, Gakif Zakirovich; Kaim, German Abramovich; Averin, Vitaly Mikhailovich; Milrud, Savely Mikhailovich; Telyatnikov, Garry Vladimirovich; Lyakhov, Viktor Prokhorovich; Abramova, Ljudmila Nikolaevna; Tarasov, Vladimir Ivanovich; Denisov, Vladislav Mikhailovich; Nasyrov, Dinam Latypovich; Stolyar, Boris Alexandrovich; Tagiev, Muzafar Suleiman-ogly; Lagno, Vladimir Ivanovich; and Kostin, Vladimir Nikolaevich, 4,026,672.

Tenthoff, Aloys; and Schwicking, Tonius Schulze, to Westfalia Separator AG. Separating drum for the centrifugal treatment of mixtures. 4,026,462, Cl. 233-29.000.

Tepper, Seymour. Support for a tomato plant. 4,026,068, Cl. 47-45.000.

Terrisse, Jean: *See—*
Lambla, Morand; and Terrisse, Jean, 4,026,962.

Texaco Development Corporation: *See—*
Brennan, Michael E.; Moss, Philip H.; and Yeakey, Ernest L., 4,026,935.
Zimmerman, Robert L.; McEntire, Edward E.; and Klein, Howard P., 4,026,836.
Zimmerman, Robert LeRoy; and Austin, Thomas Howard, 4,026,837.

Texaco Exploration Canada Ltd.: *See—*
Redford, David A., 4,026,357.

Texaco Inc.: *See—*
Allen, Joseph C., 4,026,358.
Cross, Edward A.; and Downer, John D., 4,026,694.
Lachowicz, Donald R.; and Holder, Charles B., 4,026,809.
Sample, Thomas E., Jr.; Hughes, James W.; and Tate, Jack F., 4,026,874.

Texas Dynamatics, Inc.: *See—*
Jeter, John Doise, 4,027,282.

Texas Industries, Inc.: *See—*
Harris, Philip H.; Sewell, Virgil L.; and Stevens, James. L., 4,026,717.

Texas Instruments Incorporated: *See—*
Bedenbender, John W.; and Kelly, Gilbert H., 4,026,383.
Borrello, Sebastian R.; and Sawyer, Jimmy D., 4,027,319.
Bullock, David Carl, 4,027,297.
Doherty, John, Jr., 4,026,464.

Texas Pipe Line Company: *See—*
Thompson, Albert L., 4,026,329.

Textron, Inc.: *See—*
Chmura, William J., 4,026,657.
Moertel, George B.; and Wilson, James R., 4,026,974.

Tezuka, Kiyoshi, to Murakami Kaimeido Co., Ltd. Multi-directional switching mechanism for controlling plural load circuits. 4,027,119, Cl. 200-6.00A.

Thackery, Russell H. Power tool. 4,026,337, Cl. 144-193.00R.

Theimer, Hubert, to Stumpp & Schule KG. Device for grilling and broiling food. 4,027,139, Cl. 219-525.000.

Therkildsen, Henry T., to Caterpillar Tractor Co. Lubrication system for spline connection. 4,026,386, Cl. 184-7.00R.

Theysohn, Werner: *See—*
Pohl, Ludwig; Theysohn, Werner; and Unger, Richard, 4,026,953.

Thiede, Horst: *See—*
Kummer, Franz; Mai, Gerhard; Ruthardt, Rolf; and Thiede, Horst, 4,027,326.

Thiedemann, Karl-Heinz. Apparatus for supporting pipe lines or the like. 4,026,507, Cl. 248-54.00R.

Thir, Basil: *See—*
Login, Robert Bernard; Deck, Charles Francis; and Thir, Basil, 4,026,941.

Thomas, Benjamin A., to Flow Industries, Inc. Reciprocating pump check valve assembly. 4,026,322, Cl. 137-512.000.

Thomas & Betts Corporation: *See—*
Eppler, Daniel, 4,025,998.

Thomas, Lois. Patient restraining gown. 4,026,282, Cl. 128-134.000.

Thompson, Albert L., to Texas Pipe Line Company. Method and apparatus for remotely and releasably sealing a pipeline. 4,026,329, Cl. 138-97.000.

Thompson, John T.: *See—*
Gillemot, George W., 4,026,619.
Gillemot, George W., 4,027,097.

Thompson, Larry Flack, to Bell Telephone Laboratories, Incorporated. Fabrication of iron oxide pattern. 4,027,052, Cl. 427-43.000.

Thompson, Larry Flack, to Bell Telephone Laboratories, Incorporated. Fabrication of an iron oxide film. 4,027,056, Cl. 427-226.000.

Thomson-CSF: *See—*
Laurent, Pierre; and Milosevic, Ljubimko, 4,027,261.

Thomson Industries, Inc.: *See—*
Thomson, John B., 4,025,995.

Thomson, John B., to Thomson Industries, Inc. Linear motion ball bearing assembly and ball conforming shaft. 4,025,995, Cl. 29-148.40R.

Thorn Electrical Industries Limited: *See—*
Coaton, James Richard, 4,027,189.
Ranby, Peter Whitten; and Hobbs, Doreen Yvonne, 4,026,816.

Thorne, John R.: *See—*
Newman, Frederick S.; Thorne, John R.; and Hartman, John T., 4,026,781.

Throne, James D.: *See—*
Roiko, Russell A.; and Throne, James D., 4,026,625.

Tibbs, Robert C. Forward angle plow sweep with elevated trailing wing edge. 4,026,367, Cl. 172-730.000.

Tierney, Paul A.; and Bell, Robert P., to Monsanto Company. Method of continuously processing metal cord. 4,026,334, Cl. 140-112.000.

Till, Henry R.; and Lindblad, Nero R., to Xerox Corporation. Gas impingement and suction cleaning apparatus. 4,026,701, Cl. 96-1.00R.

Time and Frequency Technology Inc.: *See—*
Wu, Joseph C.; Walsworth, Clyde R.; and Eckels, Calvin W., Jr., 4,027,332.

Timsons Limited: *See—*
Harris, John William, 4,026,537.

Tinder, David V.; and Clemett, Edwin F., Jr., to McCord Corporation. Headlamp cleaning assembly. 4,026,468, Cl. 239-66.000.

Tinder, David V.; and Mack, Walter E., to McCord Corporation. Headlamp cleaning assembly. 4,026,473, Cl. 239-229.000.

Tisell, Claes Gustav Erik Yngve: *See—*
Akhagen, Rune Verner; Tisell, Claes Gustav Erik Yngve; and Andersson, Anders Hakan, 4,026,189.

Tkatchenko, Igor, to Societe Nationale des Petroles d'Aquitaine. Polymeric diphosphorous coordinates and their metal derivatives. 4,027,084, Cl. 526-27.000.

Toda, Atsushi; Matsuoka, Yoshifumi; and Shigematsu, Koichi, to Matsushita Electric Industrial Co., Ltd. Blood pressure measuring apparatus. 4,026,277, Cl. 128-2.05A.

Toda, Michio: *See—*
Harita, Kozaburo; Ajisawa, Yukiyoshi; Iizuka, Kinji; Toda, Michio; Kinoshita, Yukihiko; Kamijo, Tetsuhide; and Kobayashi, Michihiro, 4,026,896.

Toho Beslon Kabushiki Kaisha: *See—*
Takata, Toshihiro; Kawakatsu, Yoshifumi; and Nohara, Keitsugu, 4,026,926.

Toko Incorporated: *See—*
Ogata, Yoshihiro, 4,027,174.

Tokura, Koichi; and Kaneda, Saburo, to Fujitsu Ltd. Access control unit. 4,027,291, Cl. 340-172.500.

Tokyo Denshi Kabushiki Kaisha: *See—*
Kaneda, Makoto, 4,026,496.

Tokyo Shibaura Electric Co., Ltd.: *See—*
Arakawa, Osamu; Sekiguchi, Tadaaki; and Takayanagi, Eiichi, 4,027,134.

Shintani, Takao; Nagano, Satoshi; Ishigami, Toshihiko; and Sasaki, Hiroki, 4,027,190.
Tashiro, Makoto; Hirahara, Keijiro; Yahata, Akihiro; and Ohyama, Masanobu, 4,026,994.
Toman, Donald J. Operating condition data system. 4,027,289, Cl. 340-172.500.
Tomikawa, Masami; Tsunoda, Akiji; Ohkawa, Hideo; Kaneda, Kazuhisa; and Mugino, Yutaka, to Idemitsu, Kosan Kabushiki-Kaisha (Idemitsu Kosan Co., Ltd.). Molding material having superior buffering character. 4,026,841, Cl. 260-2.5HA.
Tomioka, Kenichi: *See*—
Murakami, Masuo; Inukai, Noriyoshi; Iwamoto, Hidenori; Tamura, Toshinari; Yanagisawa, Isao; Hasegawa, Osamu; Ishii, Yoshio; Matsuda, Hideya; Shiozaki, Tetsuya; and Tomioka, Kenichi, 4,026,927.
Tomisawa, Norio; Uchiyama, Yasuji; Okumura, Takatoshi; and Takeda, Toshio, to Nippon Gakki Seizo Kabushiki Kaisha. Electronic musical instrument. 4,026,180, Cl. 84-1.250.
Tomita, Koji; Kobaru, Seikichi; Hanada, Minoru; and Tsukiura, Hiroshi, to Bristol-Myers Company. Fermentation process. 4,026,766, Cl. 195-96.000.
Topp Electronics, Inc.: *See*—
Wecker, Leon S., 4,026,102.
Torin Corporation: *See*—
Yagusic, George Joseph; and Lampietti, Bernard Pierre, 4,026,135.
Toro Company, The: *See*—
Hunter, Edwin J., 4,026,471.
Toswill, Diana Louise: *See*—
Jorro, Michael Anthony Ambrose; Rantell, Terry Dean; and Toswill, Diana Louise, 4,026,998.
Toth, Pal: *See*—
Orban, Ferenc; Orban, Maria; Pinter, Tihamer; Zsigmond, Gyorgy; Siklosi, Peter; Solymar, Karoly; Toth, Pal; and Zambo, Janos, 4,026,989.
Toth, William E.: *See*—
Bowditch, Philip N.; Toth, William E.; and Grossman, Arthur, 4,026,156.
Toupin, Richard A.: *See*—
Fan, George J.; and Toupin, Richard A., 4,027,308.
Towmotor Corporation: *See*—
Miller, Robert Henry; and Yost, John Paul, 4,026,597.
Toyokuni, Kazuo; Yamada, Shunzo; Takahashi, Teizo; Nakamura, Hajime; Nobutomo, Kazunari; and Kawakami, Shinji, to Kuboto Tekko Kabushiki Kaisha. Case for axle having universal joint. 4,026,124, Cl. 64-32.00R.
Toyota Jidosha Kogyo Kabushiki Kaisha: *See*—
Kobayashi, Nobuyuki, 4,026,168.
Kuno, Akira; Shinoda, Yoshio; and Arai, Hiroshi, 4,026,146.
Nishino, Katsumi; and Konomi, Toshiaki, 4,026,253.
Tradowsky, Michael. Vise for transfer of check-bites. 4,026,024, Cl. 32-19.000.
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Turner, Stanley. Polymeric compositions containing hydrogen bonding compound. 4,027,081, Cl. 526-15.000.
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Vanassche, Willy Joseph; Pollet, Robert Joseph; Willems, Jozef Frans; Vandenberghe, Antoon Leon; Berendsen, Jules Robert; and Pattyn, Herman Alberik, to AGFA-GEVAERT, N.V. Direct-positive silver halide emulsions having incorporated developers. 4,026,708, Cl. 96-95.000.

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van den Brink, Michiel; and Stoot, Andreas C., to Oce-van der Grinten N.V. Photoconductive element having a layer including a photoconductive cadmium compound and hydrophobic colloidal silica. 4,026,702, Cl. 96-1.500.

van der Landen, Arie, to Ingenieursbureau Marcon (Marine Consultants) B. V.; Koninklijke Fabricken Penn & Baudin B. V.; and Vredestein Loosduinen B. V. Submarine pivoting structure with ducting. 4,025,976, Cl. 9-8.00P.

van der Lely, Cornelis. Soil cultivating machines. 4,026,364, Cl. 172-68.000.

van Dijk, Christiaan P., to Pullman Incorporated. Process for halogen production. 4,027,000, Cl. 423-507.000.

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van Megen, Hubertus Johannes, to Oce-van der Grinten N.V. Magazine for storing zigzag folded belt material. 4,026,452, Cl. 226-119.000.

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van Suchtelen, Jaap, to U.S. Philips Corporation. Magnetic plate comprising drivable domains. 4,027,296, Cl. 340-174.0TF.

Van Thyne, Ray J.; and Rausch, John J., to Surface Technology Corporation. Nitrided materials. 4,026,730, Cl. 148-31.500.

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Vendramini, Dante. Racket for tennis, badminton, squash or the like. 4,026,553, Cl. 273-73.00E.

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Kline, Charles M.; and Waldrop, Thomas W., 4,026,529.
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Wells, Barry A.; and Clark, Don Richard, to Kennecott Copper Corporation. Selective extraction of molybdenum from acidic leach liquors. 4,026,988, Cl. 423-54.000.
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B 239,289	3,922,711	Nov. 25, 1975	B 300,353	3,921,734	Nov. 25, 1975
B 241,433	3,923,711	Dec. 2, 1975	B 302,271	3,929,130	Dec. 30, 1975
B 245,194	3,919,179	Nov. 11, 1975	B 302,692	3,924,598	Dec. 9, 1975
B 248,916	3,920,862	Nov. 18, 1975	B 302,836	3,923,573	Dec. 2, 1975
B 251,109	3,914,148	Oct. 21, 1975	B 302,998	3,928,233	Dec. 23, 1975
B 251,635	3,914,149	Oct. 21, 1975	B 303,011	3,930,188	Dec. 30, 1975
B 252,947	3,923,803	Dec. 2, 1975	B 303,702	3,914,131	Oct. 21, 1975
B 254,211	3,917,677	Nov. 4, 1975	B 304,687	3,924,783	Dec. 9, 1975
B 254,708	3,923,878	Dec. 2, 1975	B 305,417	3,915,882	Oct. 28, 1975
B 255,756	3,923,781	Dec. 2, 1975	B 305,868	3,921,463	Nov. 25, 1975
B 256,334	3,924,988	Dec. 9, 1975	B 305,881	3,923,478	Dec. 2, 1975
B 256,936	3,925,513	Dec. 9, 1975	B 306,655	3,924,642	Dec. 9,1975
B 258,687	3,914,221	Oct. 21, 1975	B 306,829	3,925,411	Dec. 9, 1975
B 259,236	3,924,874	Dec. 9, 1975	B 306,938	3,916,050	Oct. 28, 1975
B 259,274	3,928,688	Dec. 23, 1975	B 307,677	3,915,276	Oct. 28, 1975
B 260,455	3,925,634	Dec. 9, 1975	B 308,661	3,924,349	Dec. 9, 1975
B 260,945	3,925,250	Dec. 9, 1975	B 308,892	3,919,624	Nov. 11, 1975
B 261,378	3,913,468	Oct. 21, 1975	B 309,207	3,914,743	Oct. 21, 1975
B 261,828	3,925,551	Dec. 9, 1975	B 309,499	3,922,002	Nov. 25, 1975
B 262,241	3,925,528	Dec. 9, 1975	B 309,681	3,927,374	Dec. 16, 1975
B 262,287	3,921,209	Nov. 18, 1975	B 309,755	3,919,468	Nov. 11, 1975
B 262,378	3,914,410	Oct. 21, 1975	B 309,756	3,914,136	Oct. 21, 1975
B 262,599	3,925,323	Dec. 9, 1975	B 309,860	3,922,485	Nov. 25, 1975
B 264,257	3,928,665	Dec. 23, 1975	B 310,149	3,924,705	Dec. 9, 1975
B 264,833	3,923,566	Dec. 2, 1975	B 310,271	3,923,689	Dec. 2, 1975
B 265,369	3,925,245	Dec. 9, 1975	B 310,740	3,985,686	Oct. 12, 1976
B 265,727	3,914,479	Oct. 21, 1975	B 311,313	3,925,142	Dec. 9, 1975
B 265,862	3,915,915	Oct. 28, 1975	B 311,317	3,918,975	Nov. 11, 1975
B 266,195	3,923,599	Dec. 2, 1975	B 311,413	3,925,515	Dec. 9, 1975
B 269,673	3,914,377	Oct. 21, 1975	B 311,910	3,924,357	Dec. 9, 1975
B 270,089	3,923,875	Dec. 2, 1975	B 311,977	3,925,233	Dec. 9,1975
B 271,104	3,925,400	Dec. 9, 1975	B 312,139	3,925,530	Dec. 9, 1975
B 274,945	3,924,992	Dec. 9, 1975	B 312,477	3,923,714	Dec. 2, 1975
B 275,426	3,925,168	Dec. 9, 1975	B 313,098	3,925,045	Dec. 9, 1975
B 276,271	3,916,028	Oct. 28, 1975	B 313,531	3,925,548	Dec. 9, 1975
B 276,560	3,916,030	Oct. 28, 1975	B 313,594	3,924,626	Dec. 9, 1975
B 276,993	3,948,823	Apr. 6, 1976	B 313,900	3,915,932	Oct. 28, 1975
B 277,449	3,924,048	Dec. 2, 1975	B 314,049	3,920,588	Nov. 18, 1975
B 278,491	3,921,170	Nov. 18, 1975	B 314,255	3,923,764	Dec. 2, 1975
B 278,991	3,914,469	Oct. 21, 1975	B 314,271	3,921,845	Nov. 25, 1975
B 279,583	3,923,749	Dec. 2, 1975	B 314,489	3,925,016	Dec. 9, 1975
B 280,015	3,925,378	Dec. 9, 1975	B 314,800	3,930,087	Dec. 30, 1975
B 280,395	3,919,604	Nov. 11, 1975	B 314,977	3,923,459	Dec. 2, 1975
B 281,341	3,920,643	Nov. 18, 1975	B 315,363	3,920,673	Nov. 18, 1975
B 281,943	3,924,013	Dec. 2, 1975	B 315,397	3,923,963	Dec. 2, 1975
B 282,081	3,913,483	Oct. 21, 1975	B 315,731	3,914,108	Oct. 21, 1975
B 282,252	3,924,997	Dec. 9, 1975	B 316,014	3,920,861	Nov. 18, 1975
B 282,390	3,924,576	Dec. 9,1975	B 316,239	3,913,546	Oct. 21, 1975
B 282,819	3,982,932	Sep. 28, 1976	B 316,422	4,016,206	Apr. 19, 1977
B 283,124	3,923,512	Dec. 2, 1975	B 316,917	3,925,494	Dec. 9, 1975
B 283,300	3,925,011	Dec. 9, 1975	B 317,080	3,925,324	Dec. 9, 1975
B 284,297	3,913,722	Oct. 21, 1975	B 317,347	3,923,552	Dec. 2, 1975
B 284,427	3,952,812	Apr. 27, 1976	B 317,624	3,925,167	Dec. 9, 1975
B 285,200	3,923,680	Dec. 2, 1975	B 318,122	4,026,905	May 31, 1977
B 285,796	3,914,303	Oct. 21. 1975	B 318,195	3,915,699	Oct. 28, 1975
B 286,499	3,914,129	Oct. 21, 1975	B 318,618	3,915,365	Oct. 28, 1975
B 286,614	3,924,696	Dec. 9, 1975	B 318,640	3,925,186	Dec. 9, 1975
B 286,913	3,928,696	Dec. 23, 1975	B 318,745	3,916,571	Nov. 4, 1975
B 287,164	3,914,139	Oct. 21, 1975	B 319,226	3,925,082	Dec. 9, 1975
B 287,270	3,924,825	Dec. 9, 1975	B 319,339	3,916,056	Oct. 28, 1975

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JANUARY 28, 1975 NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	ISSUE DATE
B 319,402	3,919,568	Nov. 11, 1975	B 345,390	3,940,343	Feb. 24, 1976
B 319,414	3,928,666	Dec. 23, 1975	B 345,422	3,914,392	Oct. 21, 1975
B 320,261	3,924,033	Dec. 2, 1975	B 345,527	3,927,365	Dec. 16, 1975
B 320,452	3,925,083	Dec. 9, 1975	B 345,567	3,913,985	Oct. 21, 1975
B 320,603	3,915,571	Oct. 28, 1975	B 346,044	3,988,405	Oct. 26, 1976
B 321,018	3,921,623	Nov. 25, 1975	B 346,145	3,913,293	Oct. 21, 1975
B 321,101	3,917,163	Nov. 4, 1975	B 346,210	3,916,142	Oct. 28, 1975
B 321,938	3,923,889	Dec. 2, 1975	B 346,350	3,915,824	Oct. 28, 1975
B 322,182	3,925,390	Dec. 9, 1975	B 346,487	3,927,406	Dec. 16, 1975
B 322,239	3,920,973	Nov. 18, 1975	B 346,585	3,913,820	Oct. 21, 1975
B 322,564	3,914,373	Oct. 21, 1975	B 346,613	3,923,545	Dec. 2, 1975
B 322,621	3,920,863	Nov. 18,1975	B 346,901	3,915,583	Oct. 28, 1975
B 322,777	3,924,382	Dec. 9, 1975	B 348,083	3,923,774	Dec. 2, 1975
B 323,127	3,923,967	Dec. 2, 1975	B 348,383	3,923,452	Dec. 2, 1975
B 323,191	3,914,566	Oct. 21, 1975	B 348,495	3,914,654	Oct. 21, 1975
B 323,203	3,916,165	Oct. 28, 1975	B 348,558	3,914,109	Oct. 21, 1975
B 323,568	3,920,536	Nov. 18, 1975	B 349,141	3,915,363	Oct. 28, 1975
B 323,666	3,924,568	Dec. 9, 1975	B 349,177	3,914,033	Oct. 21, 1975
B 324,495	3,928,664	Dec. 23, 1975	B 349,231	3,915,831	Oct. 28, 1975
B 324,503	3,928,524	Dec. 23, 1975	B 349,321	3,916,103	Oct. 28, 1975
B 324,505	3,925,294	Dec. 9, 1975	B 349,948	3,914,557	Oct. 21, 1975
B 324,739	3,924,990	Dec. 9, 1975	B 350,025	3,927,415	Dec. 16, 1975
B 324,879	3,923,538	Dec. 2, 1975	B 350,143	3,924,419	Dec. 9, 1975
B 325,102	3,924,355	Dec. 9, 1975	B 350,219	3,917,802	Nov. 4, 1975
B 325,261	3,921,304	Nov. 25,1975	B 350,245	3,914,331	Oct. 21, 1975
B 326,514	3,925,080	Dec. 9, 1975	B 350,523	3,924,726	Dec. 9, 1975
B 327,109	3,925,350	Dec. 9, 1975	B 350,589	3,927,419	Dec. 16, 1975
B 327,363	3,923,504	Dec. 2, 1975	B 350,708	3,923,871	Dec. 2, 1975
B 327,612	3,925,620	Dec. 9, 1975	B 350,843	3,915,461	Oct. 28, 1975
B 327,674	3,918,540	Nov. 11, 1975	B 351,055	3,914,074	Oct. 21, 1975
B 327,899	3,925,674	Dec. 9, 1975	B 351,218	3,914,186	Oct. 21, 1975
B 328,164	3,914,703	Oct. 21, 1975	B 351,222	3,921,179	Nov. 18, 1975
B 328,200	3,916,031	Oct. 28, 1975	B 351,348	3,923,563	Dec. 2, 1975
B 328,205	3,914,106	Oct. 21, 1975	B 351,421	3,914,733	Oct. 21, 1975
B 328,210	3,914,275	Oct. 21, 1975	B 351,493	3,914,758	Oct. 21, 1975
B 328,870	3,916,486	Nov. 4, 1975	B 351,535	3,915,239	Oct. 28, 1975
B 329,115	3,924,727	Dec. 9, 1975	B 351,665	3,919,701	Nov. 11, 1975
B 329,476	3,920,562	Nov. 18, 1975	B 351,672	3,914,000	Oct. 21, 1975
B 329,612	3,925,128	Dec. 9, 1975	B 351,735	3,913,385	Oct. 21, 1975
B 329,787	3,920,688	Nov. 18, 1975	B 351,863	3,914,700	Oct. 21, 1975
B 329,816	3,923,947	Dec. 2, 1975	B 351,883	3,924,657	Dec. 9, 1975
B 330,536	3,925,452	Dec. 9, 1975	B 351,926	3,914,133	Oct. 21, 1975
B 330,828	3,913,589	Oct. 21, 1975	B 351,939	3,913,480	Oct. 21, 1975
B 331,417	3,914,157	Oct. 21, 1975	B 352,445	3,928,746	Dec. 23, 1975
B 331,557	3,916,577	Nov. 4, 1975	B 352,934	3,913,692	Oct. 21, 1975
B 331,895	3,916,403	Oct. 28, 1975	B 352,950	3,922,590	Nov. 25, 1975
B 332,527	3,924,017	Dec. 2, 1975	B 352,965	3,921,926	Nov. 25, 1975
B 332,811	3,924,359	Dec. 9, 1975	B 353,317	3,916,446	Nov. 4, 1975
B 333,876	3,921,208	Nov. 18, 1975	B 353,387	3,924,404	Dec. 9, 1975
B 333,928	3,927,172	Dec. 16, 1975	B 353,546	3,913,273	Oct. 21, 1975
B 334,251	3,924,719	Dec. 9, 1975	B 354,008	3,925,081	Dec. 9, 1975
B 334,868	3,919,469	Nov. 11, 1975	B 354,098	3,925,547	Dec. 9, 1975
B 334,985	3,923,912	Dec. 2, 1975	B 354,145	3,927,279	Dec. 16, 1975
B 335,670	3,928,686	Dec. 23, 1975	B 354,296	3,914,580	Oct. 21, 1975
B 335,741	3,925,615	Dec. 9, 1975	B 354,510	3,928,658	Dec. 23, 1975
B 335,773	3,920,953	Nov. 18, 1975	B 354,889	3,913,204	Oct. 21, 1975
B 336,129	3,923,606	Dec. 2, 1975	B 354,979	3,914,251	Oct. 21, 1975
B 336,243	3,925,422	Dec. 9, 1975	B 355,095	3,925,656	Dec. 9, 1975
B 336,345	3,925,179	Dec. 9, 1975	B 355,269	3,914,561	Oct. 21, 1975
B 336,652	3,914,211	Oct. 21, 1975	B 355,510	3,913,704	Oct. 21, 1975
B 336,902	3,918,897	Nov. 11, 1975	B 355,595	3,925,649	Dec. 9, 1975
B 336,946	3,919,425	Nov. 11, 1975	B 355,876	3,925,685	Dec. 9, 1975
B 336,978	3,923,968	Dec. 2, 1975	B 356,032	3,928,636	Dec. 23, 1975
B 337,235	3,919,386	Nov. 11, 1975	B 356,253	3,925,025	Dec. 9, 1975
B 337,409	3,925,258	Dec. 9, 1975	B 356,602	3,927,393	Dec. 16, 1975
B 337,442	3,913,658	Oct. 21, 1975	B 356,724	3,924,586	Dec. 9, 1975
B 337,703	3,914,690	Oct. 21, 1975	B 357,039	3,924,406	Dec. 9, 1975
B 337,787	3,923,506	Dec. 2, 1975	B 357,057	3,913,738	Oct. 21, 1975
B 339,059	3,924,822	Dec. 9, 1975	B 357,131	3,924,453	Dec. 9, 1975
B 339,218	3,925,121	Dec. 9, 1975	B 357,402	3,914,180	Oct. 21, 1975
B 339,699	3,933,527	Jan. 20, 1976	B 357,682	3,924,973	Dec. 9, 1975
B 339,838	3,930,221	Dec. 30, 1975	B 357,803	3,919,470	Nov. 11, 1975
B 340,212	3,922,645	Nov. 25, 1975	B 358,174	3,924,958	Dec. 9, 1975
B 340,833	3,925,208	Dec. 9, 1975	B 358,244	3,913,411	Oct. 21, 1975
B 341,579	3,913,363	Oct. 21, 1975	B 358,311	3,923,561	Dec. 2, 1975
B 342,084	3,928,694	Dec. 23, 1975	B 358,939	3,924,713	Dec. 9, 1975
B 342,423	3,925,334	Dec. 9, 1975	B 359,174	3,914,117	Oct. 21, 1975
B 342,886	3,923,507	Dec. 2, 1975	B 359,187	3,924,525	Dec. 9, 1975
B 343,136	3,919,453	Nov. 11, 1975	B 359,540	3,915,235	Oct. 28, 1975
B 343,240	3,925,693	Dec. 9, 1975	B 359,740	3,936,212	Feb. 3, 1976
B 343,506	3,916,021	Oct. 28, 1975	B 359,791	3,929,430	Dec. 30, 1975
B 343,577	3,921,165	Nov. 18, 1975	B 359,825	3,921,344	Nov. 25, 1975
B 344,203	3,928,719	Dec. 23, 1975	B 359,946	3,914,132	Oct. 21, 1975
B 344,479	3,924,042	Dec. 2, 1975	B 359,947	3,914,653	Oct. 21, 1975
B 345,060	3,916,018	Oct. 28, 1975	B 360,208	3,923,750	Dec. 2, 1975
B 345,384	3,916,146	Oct. 28, 1975	B 360,296	3,916,720	Nov. 4, 1975

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JANUARY 28, 1975 NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	ISSUE DATE
B 360,719	3,915,715	Oct. 28, 1975
B 360,910	3,925,696	Dec. 9, 1975
B 361,265	3,923,569	Dec. 2, 1975
B 361,347	3,914,642	Oct. 21, 1975
B 361,443	3,927,405	Dec. 16, 1975
B 361,569	3,914,554	Oct. 21, 1975
B 361,604	3,922,702	Nov. 25, 1975
B 361,734	3,915,764	Oct. 28, 1975
B 362,589	3,914,012	Oct. 21, 1975
B 363,205	3,923,744	Dec. 2, 1975
B 363,337	3,928,639	Dec. 23, 1975
B 363,457	3,922,595	Nov. 25, 1975
B 363,674	3,929,716	Dec. 30, 1975
B 363,892	3,913,395	Oct. 21, 1975
B 363,962	3,921,826	Nov. 25, 1975
B 364,022	3,913,499	Oct. 21, 1975
B 364,163	3,916,092	Oct. 28, 1975
B 364,241	3,916,668	Nov. 4, 1975
B 364,334	3,924,670	Dec. 9, 1975
B 364,528	3,919,510	Nov. 11, 1975
B 364,786	3,921,673	Nov. 25, 1975
B 364,910	3,925,335	Dec. 9, 1975
B 365,371	3,988,181	Oct. 26, 1976
B 365,490	3,918,527	Nov. 11, 1975
B 365,834	3,914,702	Oct. 21, 1975
B 365,841	3,925,628	Dec. 9, 1975
B 365,855	3,917,258	Nov. 4, 1975
B 366,287	3,924,946	Dec. 9, 1975
B 366,402	3,928,053	Dec. 23, 1975
B 366,589	3,914,719	Oct. 21, 1975
B 367,021	3,914,752	Oct. 21, 1975
B 367,040	3,924,775	Dec. 9, 1975
B 367,661	3,914,158	Oct. 21, 1975
B 367,739	3,923,648	Dec. 2, 1975
B 367,812	3,924,789	Dec. 9, 1975
B 368,081	3,924,691	Dec. 9, 1975
B 368,387	3,924,923	Dec. 9, 1975
B 368,392	3,913,812	Oct. 21, 1975
B 368,397	3,914,677	Oct. 21, 1975
B 368,862	3,925,549	Dec. 9, 1975
B 369,563	3,924,449	Dec. 9, 1975
B 369,607	3,923,786	Dec. 2, 1975
B 369,997	3,913,533	Oct. 21, 1975
B 370,453	3,964,101	Jun. 15, 1976
B 370,706	3,925,242	Dec. 9, 1975
B 371,073	3,930,135	Dec. 30, 1975
B 371,085	3,923,783	Dec. 2, 1975
B 371,787	3,921,217	Nov. 18, 1975
B 371,805	3,914,433	Oct. 21, 1975
B 371,836	3,923,541	Dec. 2, 1975
B 372,823	3,924,660	Dec. 9, 1975
B 373,051	3,914,162	Oct. 21, 1975
B 373,297	3,924,436	Dec. 9, 1975
B 373,326	3,920,433	Nov. 18, 1975
B 373,428	3,915,511	Oct. 28, 1975
B 375,220	3,920,417	Nov. 18, 1975
B 375,652	3,921,303	Nov. 25, 1975
B 376,504	3,914,570	Oct. 21, 1975
B 376,654	3,922,513	Nov. 25, 1975
B 376,742	3,924,392	Dec. 9, 1975
B 376,799	3,913,955	Oct. 21, 1975
B 377,172	3,918,255	Nov. 11, 1975
B 377,683	3,924,432	Dec. 9, 1975
B 377,833	3,913,884	Oct. 21, 1975
B 377,869	3,917,002	Nov. 4, 1975
B 378,621	3,923,840	Dec. 2, 1975
B 379,038	3,923,994	Dec. 2, 1975
B 379,172	3,914,379	Oct. 21, 1975
B 379,282	3,913,462	Oct. 21, 1975
B 379,955	3,913,157	Oct. 21, 1975
B 380,014	3,921,915	Nov. 25, 1975
B 380,141	3,925,161	Dec. 9, 1975
B 380,310	3,921,048	Nov. 18, 1975
B 380,312	3,913,953	Oct. 21, 1975
B 380,338	3,924,873	Dec. 9, 1975
B 380,446	3,923,836	Dec. 2, 1975
B 380,900	3,913,307	Oct. 21, 1975
B 380,926	3,925,095	Dec. 9, 1975
B 381,074	3,919,583	Nov. 11, 1975
B 381,632	3,914,732	Oct. 21, 1975
B 381,847	3,921,152	Nov. 18, 1975
B 382,018	3,929,742	Dec. 30, 1975
B 382,021	3,913,212	Oct. 21, 1975
B 382,261	3,914,991	Oct. 28, 1975
B 382,290	3,924,717	Dec. 9, 1975
B 382,783	3,919,527	Nov. 11, 1975
B 382,798	3,924,435	Dec. 9, 1975
B 382,840	3,922,007	Nov. 25, 1975
B 383,465	3,927,412	Dec. 16, 1975
B 383,581	3,925,318	Dec. 9, 1975
B 383,852	3,914,246	Oct. 21, 1975
B 384,499	3,925,135	Dec. 9, 1975
B 384,658	3,913,452	Oct. 21, 1975
B 384,773	3,915,416	Oct. 28, 1975
B 385,210	3,913,406	Oct. 21, 1975
B 386,403	3,924,895	Dec. 9, 1975
B 386,592	3,925,305	Dec. 9, 1975
B 387,039	3,924,510	Dec. 9, 1975
B 387,331	3,913,701	Oct. 21, 1975
B 387,363	3,927,378	Dec. 16, 1975
B 387,687	3,918,151	Nov. 11, 1975
B 387,761	3,914,245	Oct. 21, 1975
B 387,790	3,925,380	Dec. 9, 1975
B 387,818	3,918,935	Nov. 11, 1975
B 388,580	3,923,712	Dec. 2, 1975
B 389,070	3,914,171	Oct. 21, 1975
B 389,295	3,914,631	Oct. 21, 1975
B 389,327	3,924,504	Dec. 9, 1975
B 389,639	3,914,626	Oct. 21, 1975
B 389,726	3,921,010	Nov. 18, 1975
B 389,807	3,922,623	Nov. 25, 1975
B 389,932	3,913,268	Oct. 21, 1975
B 389,933	3,913,267	Oct. 21, 1975
B 390,679	3,913,668	Oct. 21, 1975
B 390,732	3,913,878	Oct. 21, 1975
B 391,184	3,914,214	Oct. 21, 1975
B 391,210	3,914,220	Oct. 21, 1975
B 391,437	3,915,416	Oct. 28, 1975
B 391,509	3,925,175	Dec. 9, 1975
B 391,675	3,916,017	Oct. 28, 1975
B 392,154	3,923,809	Dec. 2, 1975
B 392,242	3,926,636	Dec. 16, 1975
B 392,696	3,916,175	Oct. 28, 1975
B 392,732	3,914,903	Oct. 21, 1975
B 392,753	3,916,341	Oct. 28, 1975
B 392,894	3,914,763	Oct. 21, 1975
B 393,163	3,914,535	Oct. 21, 1975
B 393,347	3,985,800	Oct. 12, 1976
B 393,970	3,914,638	Oct. 21, 1975
B 394,088	3,914,740	Oct. 21, 1975
B 394,188	3,924,591	Dec. 9, 1975
B 394,300	3,914,159	Oct. 21, 1975
B 394,712	3,916,306	Oct. 28, 1975
B 395,478	3,922,577	Nov. 25, 1975
B 395,496	3,919,435	Nov. 11, 1975
B 395,671	3,920,418	Nov. 18, 1975
B 395,889	3,913,190	Oct. 21, 1975
B 396,025	3,913,869	Oct. 21, 1975
B 396,551	3,921,929	Nov. 25, 1975
B 397,027	3,923,736	Dec. 2, 1975
B 397,527	3,913,488	Oct. 21, 1975
B 397,990	3,914,848	Oct. 28, 1975
B 398,262	3,913,481	Oct. 21, 1975
B 398,551	3,924,924	Dec. 9, 1975
B 398,597	3,913,743	Oct. 21, 1975
B 398,625	3,920,996	Nov. 18, 1975
B 399,292	3,914,810	Oct. 28, 1975
B 399,304	3,919,567	Nov. 11, 1975
B 399,349	3,925,694	Dec. 9, 1975
B 399,766	3,915,667	Oct. 28, 1975
B 400,080	3,925,163	Dec. 9, 1975
B 400,293	3,923,719	Dec. 2, 1975
B 400,310	3,915,507	Oct. 28, 1975
B 401,133	3,924,443	Dec. 9, 1975
B 401,992	3,924,898	Dec. 9, 1975
B 402,065	3,925,413	Dec. 9, 1975
B 402,555	3,914,688	Oct. 21, 1975
B 403,140	3,913,486	Oct. 21, 1975
B 403,355	3,913,352	Oct. 21, 1975
B 403,990	3,914,684	Oct. 21, 1975
B 403,996	3,916,016	Oct. 28, 1975
B 404,290	3,924,918	Dec. 9, 1975
B 404,437	3,915,200	Oct. 28, 1975
B 405,136	3,915,565	Oct. 28, 1975
B 405,137	3,915,566	Oct. 28, 1975
B 405,160	3,924,821	Dec. 9, 1975
B 405,248	3,926,294	Dec. 16, 1975
B 405,305	3,922,111	Nov. 25, 1975
B 405,360	3,913,403	Oct. 21, 1975
B 405,495	3,924,577	Dec. 9, 1975
B 405,938	3,920,109	Nov. 18, 1975
B 406,065	3,914,199	Oct. 21, 1975

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER TRIAL VOLUNTARY PROTEST PROGRAM

JANUARY 28, 1975 NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	ISSUE DATE
B 406,357	3,924,529	Dec. 9, 1975
B 406,800	3,952,708	Apr. 27, 1976
B 407,357	3,924,614	Dec. 9, 1975
B 407,728	3,925,240	Dec. 9, 1975
B 407,736	3,924,463	Dec. 9, 1975
B 408,380	3,984,172	Oct. 5, 1976
B 408,487	3,924,046	Dec. 2, 1975
B 408,749	3,914,116	Oct. 21, 1975
B 409,026	3,925,497	Dec. 9, 1975
B 409,220	3,915,648	Oct. 28, 1975
B 409,251	3,922,620	Nov. 25, 1975
B 409,657	3,927,362	Dec. 16, 1975
B 409,816	3,921,317	Nov. 25, 1975
B 410,062	3,923,855	Dec. 2, 1975
B 410,168	3,914,717	Oct. 21, 1975
B 411,145	3,914,168	Oct. 21, 1975
B 411,356	3,919,649	Nov. 11, 1975
B 411,483	3,925,196	Dec. 9, 1975
B 411,633	3,914,741	Oct. 21, 1975
B 412,516	3,927,417	Dec. 16, 1975
B 412,619	3,925,292	Dec. 9, 1975
B 412,867	3,924,587	Dec. 9, 1975
B 413,006	3,914,850	Oct. 28, 1975
B 413,546	3,924,314	Dec. 9, 1975
B 414,129	3,925,484	Dec. 9, 1975
B 414,288	3,925,537	Dec. 9, 1975
B 415,113	3,915,717	Oct. 28, 1975
B 415,124	3,915,944	Oct. 28, 1975
B 415,845	3,925,076	Dec. 9, 1975
B 415,847	3,914,208	Oct. 21, 1975
B 415,957	3,925,635	Dec. 9, 1975
B 415,977	3,927,359	Dec. 16, 1975
B 416,598	3,923,473	Dec. 2, 1975
B 416,710	3,923,746	Dec. 2, 1975
B 416,832	3,924,975	Dec. 9, 1975
B 416,933	3,924,968	Dec. 9, 1975
B 417,299	3,918,235	Nov. 11, 1975
B 418,121	3,925,023	Dec. 9, 1975
B 418,153	3,925,251	Dec. 9, 1975
B 418,302	3,913,252	Oct. 21, 1975
B 419,327	3,921,197	Nov. 18, 1975
B 419,481	3,924,970	Dec. 9, 1975
B 420,016	3,914,572	Oct. 21, 1975
B 420,148	3,927,414	Dec. 16, 1975
B 420,514	3,923,929	Dec. 2, 1975
B 420,568	3,925,069	Dec. 9, 1975
B 421,026	3,914,785	Oct. 21, 1975
B 421,362	3,924,817	Dec. 9, 1975
B 421,383	3,925,047	Dec. 9, 1975
B 421,797	3,914,023	Oct. 21, 1975
B 422,399	3,928,656	Dec. 23, 1975
B 422,467	3,924,804	Dec. 9, 1975
B 422,949	3,921,873	Nov. 25, 1975
B 424,415	3,919,458	Nov. 11, 1975
B 424,462	3,920,522	Nov. 18, 1975
B 424,572	3,924,979	Dec. 9, 1975
B 424,748	3,924,395	Dec. 9, 1975
B 425,035	3,914,025	Oct. 21, 1975
B 425,345	3,922,015	Nov. 25, 1975
B 425,470	3,923,796	Dec. 2, 1975
B 425,539	3,916,742	Nov. 4, 1975
B 425,541	3,914,051	Oct. 21, 1975
B 425,572	3,923,822	Dec. 2, 1975
B 425,770	3,989,817	Nov. 2, 1976
B 427,631	3,921,433	Nov. 25, 1975
B 428,177	3,914,624	Oct. 21, 1975
B 428,795	3,921,056	Nov. 18, 1975
B 429,442	3,923,485	Dec. 2, 1975
B 430,106	3,918,941	Nov. 11, 1975
B 430,140	3,922,084	Nov. 25, 1975
B 430,385	4,001,104	Jan. 4, 1977
B 430,798	3,918,204	Nov. 11, 1975
B 430,944	3,922,096	Nov. 25, 1975
B 432,373	3,919,670	Nov. 11, 1975
B 433,587	3,914,567	Oct. 21, 1975
B 435,343	3,919,244	Nov. 11, 1975
B 435,844	3,925,170	Dec. 9, 1975
B 437,172	3,913,251	Oct. 21, 1975
B 437,173	3,924,627	Dec. 9, 1975
B 437,195	3,914,618	Oct. 21, 1975
B 437,450	3,922,479	Nov. 25, 1975
B 438,053	3,916,013	Oct. 28, 1975
B 438,706	3,925,050	Dec. 9, 1975
B 439,168	3,919,676	Nov. 11, 1975
B 439,669	3,921,499	Nov. 25, 1975
B 440,898	3,921,789	Nov. 25, 1975
B 441,024	3,913,629	Oct. 21, 1975
B 441,416	3,913,851	Oct. 21, 1975
B 442,280	3,914,054	Oct. 21, 1975
B 442,859	3,918,570	Nov. 11, 1975
B 442,919	3,925,483	Dec. 9, 1975
B 444,614	3,927,996	Dec. 23, 1975
B 445,471	3,914,711	Oct. 21, 1975
B 445,740	3,923,612	Dec. 2, 1975
B 447,417	4,024,727	May 24, 1977
B 448,571	3,924,760	Dec. 9, 1975
B 449,647	3,916,797	Nov. 4, 1975
B 450,499	3,920,526	Nov. 18, 1975
B 450,546	3,924,417	Dec. 9, 1975
B 450,927	3,913,844	Oct. 21, 1975
B 455,520	3,922,543	Nov. 25, 1975
B 455,775	3,914,356	Oct. 21, 1975
B 456,346	3,914,531	Oct. 21, 1975
B 459,425	3,928,773	Dec. 23, 1975
B 461,872	3,919,586	Nov. 11, 1975
B 467,684	3,915,119	Oct. 28, 1975
B 468,198	3,925,340	Dec. 9, 1975

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 48,560	4,002,772	Mar. 30, 1976	Jan. 11, 1977
B 54,859	4,000,101	Feb. 17, 1976	Dec. 28, 1976
B 59,512	3,999,216	Mar. 16, 1976	Dec. 21, 1976
B 66,272	4,014,978	Feb. 24, 1976	Mar. 29, 1977
B 71,613	4,008,393	Mar. 16, 1976	Feb. 15, 1977
B 73,017	4,001,879	Mar. 9, 1976	Jan. 4, 1977
B 78,315	3,982,192	Feb. 10, 1976	Sep. 21, 1976
B 79,099	3,982,177	Jan. 13, 1976	Sep. 21, 1976
B 97,259	3,999,614	Mar. 9, 1976	Dec. 28, 1976
B 105,006	4,007,074	Mar. 23, 1976	Feb. 8, 1977
B 111,130	4,001,380	Mar. 16, 1976	Jan. 4, 1977
B 141,968	4,013,442	Mar. 30, 1976	Mar. 22, 1977
B 150,142	3,981,767	Jan. 27, 1976	Sep. 21, 1976
B 160,045	3,983,446	Jan. 13, 1976	Sep. 28, 1976
B 160,099	3,987,221	Jan. 13, 1976	Oct. 19, 1976
B 163,463	3,981,659	Jan. 27, 1976	Sep. 21, 1976
B 167,470	4,001,101	Mar. 2, 1976	Jan. 4, 1977
B 181,208	4,001,391	Mar. 9, 1976	Jan. 4, 1977
B 200,759	3,986,872	Feb. 3, 1976	Oct. 19, 1976
B 208,916	3,987,106	Jan. 13, 1976	Oct. 19, 1976
B 214,925	3,997,648	Mar. 9, 1976	Dec. 14, 1976
B 231,416	4,000,054	Mar. 30, 1976	Dec. 28, 1976
B 236,266	4,013,624	Mar. 23, 1976	Mar. 22, 1977
B 236,342	4,001,182	Feb. 10, 1976	Jan. 4, 1977
B 248,240	3,983,556	Jan. 13, 1976	Sep. 28, 1976
B 257,143	4,000,111	Mar. 16, 1976	Dec. 28, 1976
B 270,274	3,982,223	Feb. 17, 1976	Sep. 21, 1976
B 270,351	3,997,893	Mar. 30, 1976	Dec. 14, 1976
B 271,743	4,001,195	Mar. 16, 1976	Jan. 4, 1977
B 276,026	3,992,405	Feb. 3, 1976	Nov. 16, 1976
B 279,415	4,000,697	Mar. 16, 1976	Jan. 4, 1977
B 279,969	3,986,073	Jan. 13, 1976	Oct. 12, 1976
B 281,162	4,009,481	Mar. 23, 1976	Feb. 22, 1977
B 283,941	3,995,313	Feb. 3, 1976	Nov. 30, 1976
B 288,757	4,001,072	Mar. 30, 1976	Jan. 4, 1977
B 301,143	3,991,107	Jan. 27, 1976	Nov. 9, 1976
B 302,160	3,985,774	Feb. 3, 1976	Oct. 12, 1976
B 306,668	3,985,713	Feb. 3, 1976	Oct. 12, 1976
B 307,698	3,993,763	Feb. 3, 1976	Nov. 23, 1976
B 308,659	3,981,947	Jan. 27, 1976	Sep. 21, 1976
B 311,450	3,988,976	Mar. 9, 1976	Nov. 2, 1976
B 311,779	4,013,481	Feb. 10, 1976	Mar. 22, 1977
B 313,280	4,003,591	Apr. 6, 1976	Jan. 18, 1977
B 326,211	3,988,272	Mar. 23, 1976	Oct. 26, 1976
B 328,065	4,014,752	Mar. 30, 1976	Mar. 29, 1977
B 328,077	4,014,860	Apr. 13, 1976	Mar. 29, 1977
B 328,116	4,000,774	Mar. 9, 1976	Jan. 4, 1977
B 330,719	4,001,121	Mar. 16, 1976	Jan. 4, 1977
B 330,736	3,996,299	Feb. 3, 1976	Dec. 7, 1976
B 332,442	4,001,231	Mar. 30, 1976	Jan. 4, 1977
B 333,110	3,989,867	Mar. 16, 1976	Nov. 2, 1976
B 333,247	4,001,201	Mar. 16, 1976	Jan. 4, 1977
B 333,838	4,006,263	Mar. 23, 1976	Feb. 1, 1977
B 335,783	4,013,744	Mar. 30, 1976	Mar. 22, 1977
B 336,754	3,989,805	Mar. 16, 1976	Nov. 2, 1976
B 337,023	4,013,188	Mar. 30, 1976	Mar. 22, 1977
B 337,823	4,002,746	Mar. 23, 1976	Jan. 11, 1977
B 339,194	3,982,215	Feb. 3, 1976	Sep. 21, 1976
B 339,446	4,001,067	Feb. 24, 1976	Jan. 4, 1977
B 340,170	4,000,444	Mar. 30, 1976	Dec. 28, 1976
B 344,669	4,013,655	Mar. 16, 1976	Mar. 22, 1977
B 347,661	3,999,218	Mar. 16, 1976	Dec. 21, 1976
B 348,433	3,984,405	Feb. 3, 1976	Oct. 5, 1976
B 349,370	3,989,684	Jan. 27, 1976	Nov. 2, 1976
B 351,455	4,001,309	Feb. 24, 1976	Jan. 4, 1977
B 354,222	4,012,305	Mar. 23, 1976	Mar. 15, 1977
B 354,959	3,995,996	Feb. 17, 1976	Dec. 7, 1976
B 356,187	3,981,222	Jan. 20, 1976	Sep. 21, 1976
B 356,470	4,014,789	Mar. 23, 1976	Mar. 29, 1977
B 357,526	4,001,319	Mar. 23, 1976	Jan. 4, 1977
B 358,260	3,989,661	Mar. 30, 1976	Nov. 2, 1976
B 358,427	3,989,896	Feb. 3, 1976	Nov. 2, 1976
B 359,768	4,013,684	Mar. 30, 1976	Mar. 22, 1977
B 359,901	3,981,729	Jan. 13, 1976	Sep. 21, 1976
B 361,954	4,014,753	Apr. 6, 1976	Mar. 29, 1977
B 363,565	4,004,821	Mar. 30, 1976	Jan. 25, 1977
B 364,797	3,996,131	Feb. 17, 1976	Dec. 7, 1976
B 367,092	4,014,920	Apr. 13, 1976	Mar. 29, 1977
B 367,305	3,998,640	Mar. 2, 1976	Dec. 21, 1976
B 367,621	3,989,589	Feb. 3, 1976	Nov. 2, 1976
B 369,221	3,985,834	Feb. 24, 1976	Oct. 12, 1976
B 369,373	4,013,683	Mar. 23, 1976	Mar. 22, 1977
B 369,379	4,013,754	Mar. 30, 1976	Mar. 22, 1977
B 370,309	3,989,640	Jan. 20, 1976	Nov. 2, 1976
B 371,095	4,005,074	Mar. 23, 1976	Jan. 25, 1977
B 371,635	4,010,290	Mar. 23, 1976	Mar. 1, 1977
B 371,912	3,995,738	Mar. 2, 1976	Dec. 7, 1976
B 372,016	3,989,685	Mar. 9, 1976	Nov. 2, 1976
B 372,232	4,000,967	Mar. 16, 1976	Jan. 4, 1977
B 372,722	3,998,925	Mar. 9, 1976	Dec. 21, 1976
B 373,354	3,989,870	Jan. 27, 1976	Nov. 2, 1976
B 374,553	4,008,394	Mar. 30, 1976	Feb. 15, 1977
B 374,588	3,985,899	Jan. 27, 1976	Oct. 12, 1976
B 376,749	4,014,856	Mar. 30, 1976	Mar. 29, 1977
B 378,513	3,981,750	Jan. 27, 1976	Sep. 21, 1976
B 378,760	4,001,477	Mar. 9, 1976	Jan. 4, 1977
B 379,177	3,981,976	Jan. 27, 1976	Sep. 21, 1976
B 380,137	4,014,802	Mar. 23, 1976	Mar. 29, 1977
B 381,006	4,009,447	Apr. 6, 1976	Feb. 22, 1977
B 381,709	3,984,587	Jan. 13, 1976	Oct. 5, 1976
B 381,985	3,990,775	Feb. 3, 1976	Nov. 9, 1976
B 382,120	4,013,639	Mar. 23, 1976	Mar. 22, 1977
B 383,697	4,008,211	Feb. 17, 1976	Feb. 15, 1977
B 384,225	3,998,523	Mar. 16, 1976	Dec. 21, 1976
B 384,330	3,985,613	Jan. 27, 1976	Oct. 12, 1976
B 384,654	3,992,681	Feb. 24, 1976	Nov. 16, 1976
B 385,024	3,994,911	Feb. 10, 1976	Nov. 30, 1976
B 385,483	3,993,684	Feb. 17, 1976	Nov. 23, 1976
B 385,631	3,982,924	Jan. 27, 1976	Sep. 28, 1976
B 386,257	3,981,915	Feb. 3, 1976	Sep. 21, 1976
B 386,673	3,993,717	Feb. 3, 1976	Nov. 23, 1976
B 386,828	3,992,440	Feb. 3, 1976	Nov. 16, 1976
B 387,337	D 243,157	Mar. 16, 1976	Jan. 25, 1977
B 388,675	4,012,459	Mar. 30, 1976	Mar. 15, 1977
B 389,155	4,000,970	Mar. 30, 1976	Jan. 4, 1977
B 389,304	3,986,829	Jan. 27, 1976	Oct. 19, 1976
B 390,031	3,985,799	Jan. 13, 1976	Oct. 12, 1976
B 390,408	3,992,426	Feb. 3, 1976	Nov. 16, 1976
B 390,979	4,003,850	Mar. 23, 1976	Jan. 18, 1977
B 391,473	3,988,370	Mar. 2, 1976	Oct. 26, 1976
B 391,797	3,988,046	Mar. 9, 1976	Oct. 26, 1976
B 391,828	4,014,933	Apr. 6, 1976	Mar. 29, 1977
B 391,844	3,999,165	Mar. 16, 1976	Dec. 21, 1976
B 392,798	3,996,249	Mar. 30, 1976	Dec. 7, 1976
B 394,248	3,989,764	Jan. 27, 1976	Nov. 2, 1976
B 394,350	3,982,200	Jan. 13, 1976	Sep. 21, 1976
B 394,742	4,009,285	Apr. 13, 1976	Feb. 22, 1977
B 395,554	3,998,156	Mar. 9, 1976	Dec. 21, 1976
B 395,975	4,001,085	Mar. 2, 1976	Jan. 4, 1977
B 396,164	3,989,590	Feb. 3, 1976	Nov. 2, 1976
B 396,377	D 243,148	Apr. 6, 1976	Jan. 25, 1977
B 397,674	3,998,438	Mar. 16, 1976	Dec. 21, 1976
B 398,084	3,996,239	Feb. 3, 1976	Dec. 7, 1976
B 398,220	3,990,834	Feb. 3, 1976	Nov. 9, 1976
B 398,488	3,987,991	Feb. 24, 1976	Oct. 26, 1976
B 399,098	3,997,665	Feb. 24, 1976	Dec. 14, 1976
B 399,632	4,001,046	Mar. 9, 1976	Jan. 4, 1977
B 399,908	3,983,323	Jan. 13, 1976	Sep. 28, 1976
B 400,871	3,988,893	Feb. 17, 1976	Nov. 2, 1976
B 401,042	D 242,197	Mar. 16, 1976	Nov. 9, 1976
B 401,221	4,014,791	Apr. 6, 1976	Mar. 29, 1977
B 402,162	3,994,902	Mar. 2, 1976	Nov. 30, 1976
B 402,328	3,995,545	Apr. 6, 1976	Dec. 7, 1976
B 402,553	3,983,219	Feb. 17, 1976	Sep. 28, 1976
B 402,657	4,013,665	Apr. 6, 1976	Mar. 22, 1977
B 402,929	3,991,251	Feb. 3, 1976	Nov. 9, 1976
B 403,076	4,014,917	Apr. 20, 1976	Mar. 29, 1977
B 403,243	3,996,232	Mar. 30, 1976	Dec. 7, 1976
B 403,326	4,001,212	Mar. 23, 1976	Jan. 4, 1977
B 403,477	3,995,315	Feb. 3, 1976	Nov. 30, 1976
B 403,507	3,982,095	Feb. 10, 1976	Sep. 21, 1976
B 403,766	3,994,834	Feb. 10, 1976	Nov. 30, 1976
B 403,883	4,001,481	Mar. 23, 1976	Jan. 4, 1977
B 405,726	3,981,241	Jan. 13, 1976	Sep. 21, 1976
B 406,546	D 242,966	Mar. 16, 1976	Jan. 11, 1977
B 407,205	4,000,966	Mar. 16, 1976	Jan. 4, 1977
B 407,737	3,992,546	Feb. 3, 1976	Nov. 16, 1976
B 407,812	4,010,006	Mar. 23, 1976	Mar. 1, 1977
B 408,123	4,014,887	Apr. 13, 1976	Mar. 29, 1977
B 409,848	3,983,270	Jan. 27, 1976	Sep. 28, 1976
B 410,074	4,001,303	Feb. 24, 1976	Jan. 4, 1977
B 410,694	3,995,530	Mar. 23, 1976	Dec. 7, 1976
B 411,471	3,982,933	Feb. 17, 1976	Sep. 28, 1976
B 411,624	4,001,205	Mar. 16, 1976	Jan. 4, 1977
B 411,765	3,993,428	Feb. 24, 1976	Nov. 23, 1976
B 412,068	3,981,244	Jan. 13, 1976	Sep. 21, 1976
B 412,124	4,007,000	Mar. 23, 1976	Feb. 8, 1977
B 413,379	4,001,325	Mar. 9, 1976	Jan. 4, 1977
B 414,028	3,993,738	Feb. 17, 1976	Nov. 23, 1976
B 414,266	3,993,614	Feb. 10, 1976	Nov. 23, 1976
B 414,481	3,982,979	Jan. 20, 1976	Sep. 28, 1976
B 414,971	D 242,208	Feb. 10, 1976	Nov. 9, 1976
B 415,021	3,994,173	Mar. 2, 1976	Nov. 30, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 415,122	3,997,503	Feb. 10, 1976	Dec. 14, 1976
B 415,590	4,009,317	Mar. 23, 1976	Feb. 22, 1977
B 416,257	4,001,335	Mar. 16, 1976	Jan. 4, 1977
B 416,589	3,990,363	Jan. 27, 1976	Nov. 9, 1976
B 417,014	3,981,851	Jan. 13, 1976	Sep. 21, 1976
B 417,164	4,001,360	Mar. 2, 1976	Jan. 4, 1977
B 417,349	3,985,076	Mar. 9, 1976	Oct. 12, 1976
B 417,498	4,013,471	Mar. 23, 1976	Mar. 22, 1977
B 418,489	3,989,592	Jan. 13, 1976	Nov. 2, 1976
B 419,173	3,999,728	Mar. 9, 1976	Dec. 28, 1976
B 419,582	3,989,681	Mar. 2, 1976	Nov. 2, 1976
B 420,176	4,001,017	Mar. 16, 1976	Jan. 4, 1977
B 420,321	3,990,645	Mar. 30, 1976	Nov. 9, 1976
B 420,472	3,993,934	Feb. 24, 1976	Nov. 23, 1976
B 421,373	4,001,326	Mar. 23, 1976	Jan. 4, 1977
B 421,608	4,013,806	Mar. 23, 1976	Mar. 22, 1977
B 421,975	3,994,693	Mar. 2, 1976	Nov. 30, 1976
B 422,063	3,994,835	Feb. 3, 1976	Nov. 30, 1976
B 422,156	4,010,401	Mar. 23, 1976	Mar. 1, 1977
B 423,365	3,996,186	Feb. 17, 1976	Dec. 7, 1976
B 423,404	3,990,958	Mar. 2, 1976	Nov. 9, 1976
B 423,441	3,997,137	Feb. 17, 1976	Dec. 14, 1976
B 423,867	3,990,844	Feb. 3, 1976	Nov. 9, 1976
B 423,883	3,986,871	Jan. 27, 1976	Oct. 19, 1976
B 424,354	D 242,416	Feb. 10, 1976	Nov. 23, 1976
B 424,410	4,021,196	Mar. 30, 1976	May 3, 1977
B 424,989	3,990,569	Feb. 3, 1976	Nov. 9, 1976
B 425,193	4,002,107	Mar. 23, 1976	Jan. 11, 1977
B 425,285	4,014,676	Apr. 13, 1976	Mar. 29, 1977
B 425,462	3,998,396	Mar. 9, 1976	Dec. 21, 1976
B 425,588	3,985,111	Jan. 13, 1976	Oct. 12, 1976
B 426,157	4,013,714	Mar. 23, 1976	Mar. 22, 1977
B 426,227	3,999,028	Mar. 2, 1976	Dec. 21, 1976
B 426,266	3,998,839	Mar. 2, 1976	Dec. 21, 1976
B 426,274	4,014,949	Jan. 20, 1976	Mar. 29, 1977
B 426,424	3,993,742	Feb. 3, 1976	Nov. 23, 1976
B 426,639	3,992,539	Feb. 3, 1976	Nov. 16, 1976
B 426,819	3,995,868	Feb. 17, 1976	Dec. 7, 1976
B 427,883	3,982,277	Jan. 20, 1976	Sep. 21, 1976
B 427,946	4,006,161	Mar. 23, 1976	Feb. 1, 1977
B 428,103	4,000,211	Feb. 10, 1976	Dec. 28, 1976
B 428,271	3,987,415	Mar. 23, 1976	Oct. 19, 1976
B 428,408	3,995,252	Mar. 2, 1976	Nov. 30, 1976
B 428,877	3,984,649	Jan. 27, 1976	Oct. 5, 1976
B 429,018	3,990,061	Feb. 10, 1976	Nov. 2, 1976
B 429,027	4,001,260	Mar. 23, 1976	Jan. 4, 1977
B 429,157	3,990,628	Jan. 27, 1976	Nov. 9, 1976
B 429,434	3,989,223	Feb. 17, 1976	Nov. 2, 1976
B 430,157	3,992,465	Feb. 17, 1976	Nov. 16, 1976
B 430,172	3,982,563	Jan. 13, 1976	Sep. 28, 1976
B 430,213	4,013,514	Mar. 30, 1976	Mar. 22, 1977
B 430,276	3,982,171	Jan. 20, 1976	Sep. 21, 1976
B 430,287	D 242,489	Feb. 10, 1976	Nov. 23, 1976
B 430,326	4,003,581	Mar. 23, 1976	Jan. 18, 1977
B 430,334	3,981,677	Jan. 27, 1976	Sep. 21, 1976
B 431,072	3,985,610	Jan. 20, 1976	Oct. 12, 1976
B 431,334	3,988,095	Mar. 16, 1976	Oct. 26, 1976
B 431,713	4,000,167	Feb. 10, 1976	Dec. 28, 1976
B 431,785	3,999,950	Feb. 24, 1976	Dec. 28, 1976
B 431,797	4,007,290	Mar. 30, 1976	Feb. 8, 1977
B 432,049	3,995,123	Mar. 23, 1976	Nov. 30, 1976
B 432,140	3,999,163	Mar. 23, 1976	Dec. 21, 1976
B 432,265	4,013,480	Mar. 23, 1976	Mar. 22, 1977
B 432,594	4,003,404	Mar. 30, 1976	Jan. 18, 1977
B 432,969	3,997,017	Mar. 2, 1976	Dec. 14, 1976
B 432,991	3,991,669	Mar. 2, 1976	Nov. 16, 1976
B 433,094	3,987,768	Jan. 27, 1976	Oct. 26, 1976
B 433,707	4,013,594	Mar. 23, 1976	Mar. 22, 1977
B 433,892	4,016,061	Apr. 6, 1976	Apr. 5, 1977
B 433,930	4,012,324	Mar. 23, 1976	Mar. 15, 1977
B 434,206	3,994,610	Feb. 3, 1976	Nov. 30, 1976
B 434,441	D 242,849	Mar. 16, 1976	Dec. 28, 1976
B 435,481	4,000,892	Mar. 9, 1976	Jan. 4, 1977
B 435,570	4,000,908	Mar. 16, 1976	Jan. 4, 1977
B 435,617	4,001,234	Mar. 16, 1976	Jan. 4, 1977
B 436,724	3,991,856	Feb. 24, 1976	Nov. 16, 1976
B 437,209	4,001,193	Feb. 3, 1976	Jan. 4, 1977
B 437,559	3,993,287	Feb. 3, 1976	Nov. 23, 1976
B 437,596	3,985,638	Jan. 27, 1976	Oct. 12, 1976
B 437,894	4,001,015	Mar. 2, 1976	Jan. 4, 1977
B 437,986	4,011,399	Apr. 20, 1976	Mar. 8, 1977
B 438,048	4,001,394	Mar. 23, 1976	Jan. 4, 1977
B 438,484	3,992,451	Feb. 17, 1976	Nov. 16, 1976
B 438,882	3,983,719	Feb. 24, 1976	Oct. 5, 1976
B 438,916	3,983,050	Jan. 13, 1976	Sep. 28, 1976
B 439,542	3,982,199	Jan. 27, 1976	Sep. 21, 1976
B 439,778	4,001,455	Feb. 3, 1976	Jan. 4, 1977
B 440,548	4,001,271	Mar. 16, 1976	Jan. 4, 1977
B 440,632	4,014,955	Apr. 13, 1976	Mar. 29, 1977
B 440,633	4,000,116	Feb. 10, 1976	Dec. 28, 1976
B 440,858	3,993,670	Feb. 3, 1976	Nov. 23, 1976
B 441,543	4,014,755	Mar. 23, 1976	Mar. 29, 1977
B 441,605	4,026,862	Feb. 3, 1976	May 31, 1977
B 441,723	3,988,249	Mar. 16, 1976	Oct. 26, 1976
B 441,789	4,001,449	Mar. 30, 1976	Jan. 4, 1977
B 442,163	D 242,192	Mar. 16, 1976	Nov. 9, 1976
B 442,295	4,000,477	Mar. 16, 1976	Dec. 28, 1976
B 442,431	4,011,260	Mar. 23, 1976	Mar. 8, 1977
B 442,810	3,997,533	Feb. 24, 1976	Dec. 14, 1976
B 442,866	3,982,351	Feb. 24, 1976	Sep. 28, 1976
B 442,953	4,002,657	Mar. 23, 1976	Jan. 11, 1977
B 442,970	3,989,890	Feb. 3, 1976	Nov. 2, 1976
B 443,163	3,981,242	Feb. 3, 1976	Sep. 21, 1976
B 443,446	D 242,494	Apr. 6, 1976	Nov. 23, 1976
B 443,563	3,996,204	Feb. 24, 1976	Dec. 7, 1976
B 443,647	3,990,737	Feb. 17, 1976	Nov. 9, 1976
B 443,712	3,982,233	Jan. 27, 1976	Sep. 21, 1976
B 444,078	4,014,854	Mar. 23, 1976	Mar. 29, 1977
B 444,294	4,013,634	Mar. 30, 1976	Mar. 22, 1977
B 444,437	3,995,171	Mar. 9, 1976	Nov. 30, 1976
B 445,166	4,001,252	Mar. 2, 1976	Jan. 4, 1977
B 445,459	3,988,889	Feb. 3, 1976	Nov. 2, 1976
B 445,493	3,994,903	Mar. 2, 1976	Nov. 30, 1976
B 445,690	3,999,584	Feb. 3, 1976	Dec. 28, 1976
B 446,107	4,001,276	Mar. 9, 1976	Jan. 4, 1977
B 446,956	4,014,765	Apr. 13, 1976	Mar. 29, 1977
B 447,000	3,984,419	Feb. 3, 1976	Oct. 5, 1976
B 447,440	3,991,724	Feb. 17, 1976	Nov. 16, 1976
B 449,892	3,997,919	Mar. 23, 1976	Dec. 14, 1976
B 449,988	4,014,794	Mar. 30, 1976	Mar. 29, 1977
B 450,196	3,997,701	Feb. 10, 1976	Dec. 14, 1976
B 450,413	4,007,463	Mar. 23, 1976	Feb. 8, 1977
B 450,521	3,982,838	Feb. 17, 1976	Sep. 28, 1976
B 450,701	3,991,084	Mar. 16, 1976	Nov. 9, 1976
B 450,708	3,989,724	Mar. 9, 1976	Nov. 2, 1976
B 450,870	3,998,951	Mar. 16, 1976	Dec. 21, 1976
B 450,967	3,983,055	Jan. 13, 1976	Sep. 28, 1976
B 451,248	3,997,758	Mar. 2, 1976	Dec. 14, 1976
B 451,308	3,991,037	Feb. 17, 1976	Nov. 9, 1976
B 451,396	4,000,450	Apr. 13, 1976	Dec. 28, 1976
B 451,438	Re. 29,066	Mar. 2, 1976	Dec. 7, 1976
B 451,534	3,986,033	Jan. 13, 1976	Oct. 12, 1976
B 452,034	4,002,367	Mar. 23, 1976	Jan. 11, 1977
B 452,138	4,004,278	Mar. 23, 1976	Jan. 18, 1977
B 452,293	4,014,726	Mar. 30, 1976	Mar. 29, 1977
B 452,501	4,001,111	Mar. 16, 1976	Jan. 4, 1977
B 452,672	3,981,602	Jan. 13, 1976	Sep. 21, 1976
B 452,879	4,001,089	Mar. 16, 1976	Jan. 4, 1977
B 452,883	3,981,735	Jan. 27, 1976	Sep. 21, 1976
B 452,915	4,013,933	Mar. 30, 1976	Mar. 22, 1977
B 452,938	3,994,719	Feb. 17, 1976	Nov. 30, 1976
B 452,944	4,009,773	Mar. 30, 1976	Mar. 1, 1977
B 453,031	3,998,678	Mar. 16, 1976	Dec. 21, 1976
B 453,067	4,005,394	Mar. 23, 1976	Jan. 25, 1977
B 453,238	3,997,063	Mar. 2, 1976	Dec. 14, 1976
B 453,432	4,000,514	Mar. 16, 1976	Dec. 28, 1976
B 453,533	3,997,744	Feb. 17, 1976	Dec. 14, 1976
B 453,616	3,987,376	Jan. 27, 1976	Oct. 19, 1976
B 453,759	3,989,790	Jan. 27, 1976	Nov. 2, 1976
B 453,960	4,014,701	Apr. 13, 1976	Mar. 29, 1977
B 454,283	3,995,153	Feb. 3, 1976	Nov. 30, 1976
B 454,833	4,008,733	Mar. 30, 1976	Feb. 22, 1977
B 455,425	3,990,060	Feb. 3, 1976	Nov. 2, 1976
B 455,481	3,991,092	Feb. 24, 1976	Nov. 9, 1976
B 455,486	4,001,353	Mar. 16, 1976	Jan. 4, 1977
B 455,686	4,001,156	Mar. 2, 1976	Jan. 4, 1977
B 455,759	3,984,242	Feb. 24, 1976	Oct. 5, 1976
B 455,806	3,998,919	Mar. 23, 1976	Dec. 21, 1976
B 456,069	3,998,991	Mar. 9, 1976	Dec. 21, 1976
B 456,148	3,984,269	Jan. 13, 1976	Oct. 5, 1976
B 456,153	3,997,992	Mar. 9, 1976	Dec. 21, 1976
B 456,384	4,014,859	Apr. 6, 1976	Mar. 29, 1977
B 456,579	3,993,715	Feb. 10, 1976	Nov. 23, 1976
B 456,869	4,001,277	Mar. 9, 1976	Jan. 4, 1977
B 456,900	3,996,262	Feb. 3, 1976	Dec. 7, 1976
B 456,905	4,013,431	Mar. 23, 1976	Mar. 22, 1977
B 457,547	3,996,397	Feb. 17, 1976	Dec. 7, 1976
B 457,850	3,993,586	Feb. 10, 1976	Nov. 23, 1976
B 457,862	3,987,195	Jan. 27, 1976	Oct. 19, 1976
B 457,886	3,988,498	Jan. 13, 1976	Oct. 26, 1976
B 457,931	4,001,229	Mar. 16, 1976	Jan. 4, 1977
B 458,500	3,997,805	Feb. 24, 1976	Dec. 14, 1976
B 458,617	3,984,422	Feb. 3, 1976	Oct. 5, 1976
B 458,964	3,996,615	Mar. 2, 1976	Dec. 7, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 459,190	4,010,786	Mar. 30, 1976	Mar. 8, 1977	B 475,236	3,989,990	Feb. 3, 1976	Nov. 2, 1976
B 459,381	4,000,017	Mar. 9, 1976	Dec. 28, 1976	B 475,385	4,001,071	Mar. 9, 1976	Jan. 4, 1977
B 459,408	4,018,890	Mar. 23, 1976	Apr. 19, 1977	B 475,681	3,983,332	Jan. 20, 1976	Sep. 28, 1976
B 459,597	3,996,711	Feb. 17, 1976	Dec. 14, 1976	B 476,267	4,005,068	Apr. 6, 1976	Jan. 25, 1977
B 459,811	3,982,173	Jan. 20, 1976	Sep. 21, 1976	B 476,372	3,985,771	Feb. 24, 1976	Oct. 12, 1976
B 459,821	4,005,954	Mar. 30, 1976	Feb. 1, 1977	B 476,542	4,013,549	Mar. 30, 1976	Mar. 22, 1977
B 460,388	3,989,448	Jan. 27, 1976	Nov. 2, 1976	B 476,568	3,999,456	Mar. 16, 1976	Dec. 28, 1976
B 460,441	3,981,828	Jan. 13, 1976	Sep. 21, 1976	B 476,577	3,982,070	Jan. 20, 1976	Sep. 21, 1976
B 460,846	3,985,817	Feb. 24, 1976	Oct. 12, 1976	B 476,681	3,986,181	Jan. 13, 1976	Oct. 12, 1976
B 461,184	3,992,482	Feb. 17, 1976	Nov. 16, 1976	B 476,776	3,998,715	Mar. 23, 1976	Dec. 21, 1976
B 461,250	4,000,768	Mar. 16, 1976	Jan. 4, 1977	B 476,967	3,995,206	Mar. 9, 1976	Nov. 30, 1976
B 461,336	3,982,231	Feb. 3, 1976	Sep. 21, 1976	B 477,252	3,985,759	Jan. 13, 1976	Oct. 12, 1976
B 461,352	3,981,681	Jan. 13, 1976	Sep. 21, 1976	B 477,481	3,991,076	Feb. 3, 1976	Nov. 9, 1976
B 461,685	4,013,661	Mar. 30, 1976	Mar. 22, 1977	B 477,584	D 242,855	Apr. 6, 1976	Dec. 28, 1976
B 461,752	4,016,541	Apr. 20, 1976	Apr. 5, 1977	B 477,597	3,993,912	Feb. 17, 1976	Nov. 23, 1976
B 461,874	3,982,276	Jan. 27, 1976	Sep. 21, 1976	B 477,892	4,010,355	Mar. 30, 1976	Mar. 1, 1977
B 462,030	4,009,342	Mar. 23, 1976	Feb. 22, 1977	B 478,234	4,010,421	Mar. 30, 1976	Mar. 1, 1977
B 462,386	3,988,188	Jan. 13, 1976	Oct. 26, 1976	B 478,739	3,992,253	Feb. 17, 1976	Nov. 16, 1976
B 462,424	3,989,602	Feb. 24, 1976	Nov. 2, 1976	B 479,175	3,985,700	Feb. 17, 1976	Oct. 12, 1976
B 462,828	3,998,395	Mar. 9, 1976	Dec. 21, 1976	B 479,242	3,983,074	Feb. 17, 1976	Sep. 28, 1976
B 462,893	3,984,253	Feb. 24, 1976	Oct. 5, 1976	B 479,502	3,999,030	Mar. 16, 1976	Dec. 21, 1976
B 463,322	3,989,982	Jan. 20, 1976	Nov. 2, 1976	B 479,681	D 242,672	Mar. 16, 1976	Dec. 14, 1976
B 463,388	3,992,605	Feb. 10, 1976	Nov. 16, 1976	B 479,969	4,001,132	Mar. 9, 1976	Jan. 4, 1977
B 463,473	4,002,068	Mar. 23, 1976	Jan. 11, 1977	B 480,114	4,001,327	Mar. 2, 1976	Jan. 4, 1977
B 463,591	4,015,051	Mar. 30, 1976	Mar. 29, 1977	B 480,251	4,008,700	Mar. 23, 1976	Feb. 22, 1977
B 463,671	3,985,385	Jan. 13, 1976	Oct. 12, 1976	B 480,287	4,006,029	Mar. 30, 1976	Feb. 1, 1977
B 464,027	3,999,390	Mar. 16, 1976	Dec. 28, 1976	B 480,292	3,994,011	Mar. 16, 1976	Nov. 23, 1976
B 464,290	3,990,307	Feb. 3, 1976	Nov. 9, 1976	B 480,350	3,994,164	Feb. 10, 1976	Nov. 30, 1976
B 464,491	4,015,612	Mar. 30, 1976	Apr. 5, 1977	B 480,384	3,999,737	Mar. 23, 1976	Dec. 28, 1976
B 464,587	3,991,091	Feb. 3, 1976	Nov. 9, 1976	B 480,452	3,994,923	Feb. 10, 1976	Nov. 30, 1976
B 464,593	3,997,659	Mar. 9, 1976	Dec. 14, 1976	B 480,473	3,995,608	Mar. 2, 1976	Dec. 7, 1976
B 465,145	3,981,148	Jan. 27, 1976	Sep. 21, 1976	B 480,604	3,985,251	Jan. 13, 1976	Oct. 12, 1976
B 465,202	3,989,757	Feb. 24, 1976	Nov. 2, 1976	B 480,625	3,996,227	Feb. 24, 1976	Dec. 7, 1976
B 465,393	3,987,390	Jan. 27, 1976	Oct. 19, 1976	B 480,662	3,988,382	Mar. 2, 1976	Oct. 26, 1976
B 465,688	3,989,770	Jan. 27, 1976	Nov. 2, 1976	B 480,740	3,996,431	Mar. 2, 1976	Dec. 7, 1976
B 465,955	3,997,502	Feb. 3, 1976	Dec. 14, 1976	B 480,749	3,999,207	Mar. 9, 1976	Dec. 21, 1976
B 466,304	4,007,095	Mar. 23, 1976	Feb. 8, 1977	B 480,987	4,001,459	Mar. 30, 1976	Jan. 4, 1977
B 466,318	3,999,115	Mar. 9, 1976	Dec. 21, 1976	B 481,048	3,998,542	Mar. 16, 1976	Dec. 21, 1976
B 466,390	3,983,349	Feb. 24, 1976	Sep. 28, 1976	B 481,190	4,013,468	Mar. 30, 1976	Mar. 22, 1977
B 466,419	4,011,087	Mar. 23, 1976	Mar. 8, 1977	B 481,600	3,981,235	Jan. 27, 1976	Sep. 21, 1976
B 466,444	3,986,039	Jan. 20, 1976	Oct. 12, 1976	B 481,737	3,982,057	Jan. 13, 1976	Sep. 21, 1976
B 466,906	3,993,037	Mar. 16, 1976	Nov. 23, 1976	B 481,778	4,001,385	Mar. 30, 1976	Jan. 4, 1977
B 466,929	3,991,195	Jan. 27, 1976	Nov. 9, 1976	B 481,930	3,992,717	Feb. 24, 1976	Nov. 16, 1976
B 467,250	3,997,428	Feb. 3, 1976	Dec. 14, 1976	B 481,989	4,008,337	Mar. 23, 1976	Feb. 15, 1977
B 467,328	3,997,599	Mar. 9, 1976	Dec. 14, 1976	B 482,058	4,001,398	Mar. 2, 1976	Jan. 4, 1977
B 467,412	3,981,265	Jan. 13, 1976	Sep. 21, 1976	B 482,660	3,995,026	Feb. 10, 1976	Nov. 30, 1976
B 467,486	3,991,725	Mar. 16, 1976	Nov. 16, 1976	B 482,709	3,985,733	Feb. 24, 1976	Oct. 12, 1976
B 467,971	3,983,453	Jan. 13, 1976	Sep. 28, 1976	B 482,907	3,984,811	Jan. 20, 1976	Oct. 5, 1976
B 468,052	3,988,335	Feb. 10, 1976	Oct. 26, 1976	B 483,247	4,001,889	Apr. 13, 1976	Jan. 4, 1977
B 468,100	3,995,107	Mar. 9, 1976	Nov. 30, 1976	B 483,256	3,981,723	Feb. 10, 1976	Sep. 21, 1976
B 468,330	4,001,475	Mar. 16, 1976	Jan. 4, 1977	B 483,268	3,995,215	Mar. 9, 1976	Nov. 30, 1976
B 468,350	3,981,922	Jan. 13, 1976	Sep. 21, 1976	B 483,606	3,986,990	Jan. 27, 1976	Oct. 19, 1976
B 468,421	4,014,739	Mar. 30, 1976	Mar. 29, 1977	B 483,615	3,988,637	Jan. 27, 1976	Oct. 26, 1976
B 468,603	4,003,839	Mar. 23, 1976	Jan. 18, 1977	B 483,746	4,014,923	Mar. 23, 1976	Mar. 29, 1977
B 469,036	4,005,926	Mar. 16, 1976	Feb. 1, 1977	B 483,762	3,993,608	Feb. 10, 1976	Nov. 23, 1976
B 469,468	4,000,220	Mar. 16, 1976	Dec. 28, 1976	B 483,865	3,985,693	Jan. 13, 1976	Oct. 12, 1976
B 469,947	3,984,153	Jan. 20, 1976	Oct. 5, 1976	B 484,029	3,983,558	Feb. 10, 1976	Sep. 28, 1976
B 470,170	3,986,410	Jan. 13, 1976	Oct. 19, 1976	B 484,067	3,992,374	Feb. 17, 1976	Nov. 16, 1976
B 470,305	4,014,043	Apr. 6, 1976	Mar. 22, 1977	B 484,068	3,994,937	Mar. 2, 1976	Nov. 30, 1976
B 470,348	3,981,929	Jan. 13, 1976	Sep. 21, 1976	B 484,121	3,997,770	Mar. 16, 1976	Dec. 14, 1976
B 470,576	3,997,507	Feb. 24, 1976	Dec. 14, 1976	B 484,269	4,000,159	Feb. 10, 1976	Dec. 28, 1976
B 470,601	3,985,655	Mar. 9, 1976	Oct. 12, 1976	B 484,332	3,986,540	Mar. 2, 1976	Oct. 19, 1976
B 470,798	3,987,480	Jan. 20, 1976	Oct. 19, 1976	B 484,365	3,983,578	Jan. 27, 1976	Sep. 28, 1976
B 470,853	4,002,101	Mar. 23, 1976	Jan. 11, 1977	B 484,419	4,001,292	Mar. 9, 1976	Jan. 4, 1977
B 470,899	3,996,441	Mar. 2, 1976	Dec. 7, 1976	B 484,437	4,013,740	Mar. 30, 1976	Mar. 22, 1977
B 470,900	4,001,213	Mar. 2, 1976	Jan. 4, 1977	B 484,482	3,994,017	Mar. 23, 1976	Nov. 23, 1976
B 470,945	4,014,848	Apr. 13, 1976	Mar. 29, 1977	B 484,769	3,999,498	Mar. 16, 1976	Dec. 28, 1976
B 471,116	4,001,318	Feb. 17, 1976	Jan. 4, 1977	B 485,051	3,992,418	Feb. 17, 1976	Nov. 16, 1976
B 471,221	3,981,974	Jan. 13, 1976	Sep. 21, 1976	B 485,060	3,983,067	Feb. 17, 1976	Sep. 28, 1976
B 471,405	3,993,576	Feb. 10, 1976	Nov. 23, 1976	B 485,169	3,989,791	Mar. 16, 1976	Nov. 2, 1976
B 471,494	3,993,660	Mar. 16, 1976	Nov. 23, 1976	B 485,188	4,001,170	Mar. 16, 1976	Jan. 4, 1977
B 471,579	3,985,689	Jan. 13, 1976	Oct. 12, 1976	B 485,401	3,985,859	Jan. 27, 1976	Oct. 12, 1976
B 471,617	3,994,871	Feb. 10, 1976	Nov. 30, 1976	B 485,575	3,996,565	Feb. 24, 1976	Dec. 7, 1976
B 471,681	4,012,844	Apr. 13, 1976	Mar. 22, 1977	B 485,926	4,006,357	Mar. 23, 1976	Feb. 1, 1977
B 471,735	3,989,408	Feb. 3, 1976	Nov. 2, 1976	B 485,972	4,017,472	Mar. 23, 1976	Apr. 12, 1977
B 471,836	4,000,150	Feb. 24, 1976	Dec. 28, 1976	B 486,280	3,983,130	Feb. 3, 1976	Sep. 28, 1976
B 472,241	3,992,453	Feb. 17, 1976	Nov. 16, 1976	B 486,614	3,995,835	Feb. 17, 1976	Dec. 7, 1976
B 472,256	3,985,789	Jan. 13, 1976	Oct. 12, 1976	B 486,678	4,001,273	Mar. 2, 1976	Jan. 4, 1977
B 472,284	3,982,078	Jan. 13, 1976	Sep. 21, 1976	B 486,828	3,989,651	Mar. 2, 1976	Nov. 2, 1976
B 472,591	4,013,029	Apr. 6, 1976	Mar. 22, 1977	B 487,062	D 241,256	Feb. 10, 1976	Nov. 9, 1976
B 472,760	4,001,330	Apr. 13, 1976	Jan. 4, 1977	B 487,078	4,012,895	Mar. 30, 1976	Mar. 22, 1977
B 473,039	3,985,747	Feb. 10, 1976	Oct. 12, 1976	B 487,133	3,989,826	Jan. 27, 1976	Nov. 2, 1976
B 473,040	3,985,738	Feb. 10, 1976	Oct. 12, 1976	B 487,260	3,990,610	Jan. 27, 1976	Nov. 9, 1976
B 473,813	3,989,071	Mar. 9, 1976	Nov. 2, 1976	B 487,411	3,983,579	Feb. 24, 1976	Sep. 28, 1976
B 473,972	3,984,043	Jan. 13, 1976	Oct. 5, 1976	B 487,423	3,998,810	Mar. 2, 1976	Dec. 21, 1976
B 474,573	3,988,375	Jan. 20, 1976	Oct. 26, 1976	B 487,427	3,995,788	Mar. 2, 1976	Dec. 7, 1976
B 474,747	3,997,704	Feb. 24, 1976	Dec. 14, 1976	B 487,467	4,014,847	Apr. 13, 1976	Mar. 29, 1977

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 487,529	4,022,750	Mar. 30, 1976	May 10, 1977	B 497,960	3,991,325	Jan. 20, 1976	Nov. 9, 1976
B 488,111	3,985,765	Jan. 13, 1976	Oct. 12, 1976	B 498,208	4,001,480	Apr. 13, 1976	Jan. 4, 1977
B 488,395	3,982,245	Jan. 27, 1976	Sep. 21, 1976	B 498,288	4,013,657	Mar. 23, 1976	Mar. 22, 1977
B 488,634	3,982,158	Jan. 20, 1976	Sep. 21, 1976	B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 488,756	3,991,810	Mar. 16, 1976	Nov. 16, 1976	B 498,205	3,989,611	Feb. 10, 1976	Nov. 2, 1976
B 488,836	4,013,121	Mar. 30, 1976	Mar. 22, 1977	B 498,500	3,982,241	Jan. 20, 1976	Sep. 21, 1976
B 489,290	3,998,081	Feb. 17, 1976	Dec. 21, 1976	B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 489,328	3,990,088	Jan. 20, 1976	Nov. 2, 1976	B 498,820	3,996,670	Mar. 9, 1976	Dec. 14, 1976
B 489,331	3,996,175	Feb. 17, 1976	Dec. 7, 1976	B 498,951	3,996,907	Mar. 2, 1976	Dec. 14, 1976
B 489,485	D 243,266	Apr. 13, 1976	Feb. 1, 1977	B 499,171	3,985,192	Jan. 27, 1976	Oct. 12, 1976
B 489,550	4,000,710	Mar. 16, 1976	Jan. 4, 1977	B 499,209	3,995,907	Feb. 24, 1976	Dec. 7, 1976
B 489,685	3,984,085	Feb. 24, 1976	Oct. 5, 1976	B 499,227	3,981,344	Jan. 27, 1976	Sep. 21, 1976
B 490,067	3,986,600	Jan. 27, 1976	Oct. 19, 1976	B 499,324	4,001,375	Mar. 16, 1976	Jan. 4, 1977
B 490,547	3,999,439	Feb. 24, 1976	Dec. 28, 1976	B 499,352	3,981,391	Jan. 27, 1976	Sep. 21, 1976
B 490,551	D 243,168	Apr. 6, 1976	Jan. 25, 1977	B 499,370	4,013,544	Mar. 30, 1976	Mar. 22, 1977
B 490,589	3,990,680	Feb. 3, 1976	Nov. 9, 1976	B 499,718	3,990,058	Jan. 27, 1976	Nov. 2, 1976
B 490,623	3,996,964	Mar. 2, 1976	Dec. 14, 1976	B 499,786	4,000,663	Mar. 16, 1976	Jan. 4, 1977
B 490,647	3,985,196	Feb. 24, 1976	Oct. 12, 1976	B 500,171	3,997,262	Mar. 30, 1976	Dec. 14, 1976
B 490,806	3,989,486	Feb. 3, 1976	Nov. 2, 1976	B 500,176	3,995,316	Feb. 3, 1976	Nov. 30, 1976
B 490,812	3,998,842	Mar. 30, 1976	Dec. 21, 1976	B 500,408	D 242,721	Mar. 16, 1976	Dec. 14, 1976
B 490,946	3,993,652	Feb. 17, 1976	Nov. 23, 1976	B 500,945	3,996,817	Feb. 24, 1976	Dec. 14, 1976
B 490,995	3,995,031	Feb. 3, 1976	Nov. 30, 1976	B 500,959	4,014,853	Apr. 13, 1976	Mar. 29, 1977
B 491,032	3,981,892	Feb. 10, 1976	Sep. 21, 1976	B 500,981	3,984,681	Jan. 27, 1976	Oct. 5, 1976
B 491,052	3,985,790	Mar. 2, 1976	Oct. 12, 1976	B 501,122	3,981,385	Feb. 17, 1976	Sep. 21, 1976
B 491,111	3,997,916	Feb. 17, 1976	Dec. 14, 1976	B 501,181	3,984,761	Feb. 10, 1976	Oct. 5, 1976
B 491,455	3,991,167	Feb. 3, 1976	Nov. 9, 1976	B 501,253	3,994,015	Feb. 3, 1976	Nov. 23, 1976
B 491,501	3,984,914	Jan. 13, 1976	Oct. 12, 1976	B 501,317	3,985,643	Jan. 13, 1976	Oct. 12, 1976
B 491,618	4,007,950	Mar. 16, 1976	Feb. 15, 1977	B 501,379	4,013,696	Mar. 30, 1976	Mar. 22, 1977
B 491,650	3,999,044	Mar. 9, 1976	Dec. 21, 1976	B 501,415	3,982,051	Jan. 13, 1976	Sep. 21, 1976
B 491,673	3,994,770	Feb. 17, 1976	Nov. 30, 1976	B 501,482	4,012,650	Jan. 13, 1976	Mar. 15, 1977
B 491,776	3,986,298	Mar. 16, 1976	Oct. 19, 1976	B 501,503	4,001,640	Mar. 2, 1976	Jan. 4, 1977
B 491,883	3,984,412	Feb. 3, 1976	Oct. 5, 1976	B 501,540	3,985,694	Jan. 13, 1976	Oct. 12, 1976
B 491,906	D 242,223	Feb. 10, 1976	Nov. 9, 1976	B 501,975	3,998,466	Mar. 2, 1976	Dec. 21, 1976
B 492,039	3,997,541	Feb. 24, 1976	Dec. 14, 1976	B 501,993	3,981,606	Jan. 13, 1976	Sep. 21, 1976
B 492,093	4,003,658	Mar. 23, 1976	Jan. 18, 1977	B 502,151	3,998,614	Mar. 23, 1976	Dec. 21, 1976
B 492,120	3,995,692	Feb. 24, 1976	Dec. 7, 1976	B 502,161	4,000,500	Mar. 2, 1976	Dec. 28, 1976
B 492,301	3,981,073	Jan. 13, 1976	Sep. 21, 1976	B 502,289	3,982,274	Jan. 13, 1976	Sep. 21, 1976
B 492,373	4,010,908	Mar. 30, 1976	Mar. 8, 1977	B 502,381	D 242,231	Mar. 16, 1976	Nov. 9, 1976
B 492,688	3,983,415	Jan. 20, 1976	Sep. 28, 1976	B 502,540	3,983,698	Jan. 13, 1976	Oct. 5, 1976
B 492,716	3,998,739	Mar. 2, 1976	Dec. 21, 1976	B 502,571	D 242,433	Apr. 6, 1976	Nov. 23, 1976
B 492,774	4,001,843	Mar. 9, 1976	Jan. 4, 1977	B 502,589	3,989,652	Jan. 27, 1976	Nov. 2, 1976
B 492,902	3,993,859	Feb. 24, 1976	Nov. 23, 1976	B 502,652	3,989,186	Feb. 24, 1976	Nov. 2, 1976
B 492,946	3,991,303	Jan. 27, 1976	Nov. 9, 1976	B 502,667	3,991,431	Feb. 24, 1976	Nov. 16, 1976
B 493,254	D 243,267	Apr. 13, 1976	Feb. 1, 1977	B 502,973	3,982,161	Jan. 27, 1976	Sep. 21, 1976
B 493,370	3,984,792	Mar. 16, 1976	Oct. 5, 1976	B 502,993	3,992,489	Feb. 17, 1976	Nov. 16, 1976
B 493,463	4,013,510	Mar. 23, 1976	Mar. 22, 1977	B 503,029	3,986,879	Jan. 27, 1976	Oct. 19, 1976
B 493,474	4,013,565	Mar. 23, 1976	Mar. 22, 1977	B 503,345	4,001,235	Feb. 24, 1976	Jan. 4, 1977
B 493,501	3,988,061	Feb. 3, 1976	Oct. 26, 1976	B 503,371	4,009,401	Mar. 30, 1976	Feb. 22, 1977
B 493,686	4,008,338	Mar. 23, 1976	Feb. 15, 1977	B 503,436	3,988,819	Feb. 24, 1976	Nov. 2, 1976
B 493,955	3,989,830	Mar. 9, 1976	Nov. 2, 1976	B 503,456	4,007,702	Mar. 23, 1976	Feb. 15, 1977
B 493,981	3,990,165	Mar. 9, 1976	Nov. 9, 1976	B 503,521	3,999,646	Mar. 16, 1976	Dec. 28, 1976
B 494,234	3,983,808	Feb. 10, 1976	Oct. 5, 1976	B 503,579	3,989,680	Feb. 10, 1976	Nov. 2, 1976
B 494,339	4,001,255	Mar. 16, 1976	Jan. 4, 1977	B 503,618	3,997,782	Mar. 9, 1976	Dec. 14, 1976
B 494,383	3,991,289	Feb. 3, 1976	Nov. 9, 1976	B 503,742	3,989,756	Feb. 17, 1976	Nov. 2, 1976
B 494,669	3,991,104	Feb. 3, 1976	Nov. 9, 1976	B 503,776	4,016,000	Mar. 23, 1976	Apr. 5, 1977
B 494,691	3,987,457	Mar. 16, 1976	Oct. 19, 1976	B 503,780	3,990,055	Mar. 16, 1976	Nov. 2, 1976
B 494,806	3,989,210	Feb. 3, 1976	Nov. 2, 1976	B 503,817	3,988,307	Jan. 13, 1976	Oct. 26, 1976
B 494,944	3,992,469	Feb. 17, 1976	Nov. 16, 1976	B 504,056	3,993,923	Feb. 24, 1976	Nov. 23, 1976
B 495,185	3,999,166	Mar. 9, 1976	Dec. 21, 1976	B 504,061	3,987,534	Mar. 16, 1976	Oct. 26, 1976
B 495,331	4,000,456	Mar. 16, 1976	Dec. 28, 1976	B 504,156	3,999,048	Mar. 23, 1976	Dec. 21, 1976
B 495,402	3,983,988	Feb. 17, 1976	Oct. 5, 1976	B 504,169	3,981,219	Jan. 13, 1976	Sep. 21, 1976
B 495,408	4,000,222	Feb. 3, 1976	Dec. 28, 1976	B 504,404	3,996,499	Feb. 24, 1976	Dec. 7, 1976
B 495,489	3,984,571	Feb. 3, 1976	Oct. 5, 1976	B 504,405	4,007,401	Apr. 13, 1976	Feb. 8, 1977
B 495,550	3,993,666	Feb. 3, 1976	Nov. 23, 1976	B 504,439	3,999,398	Mar. 16, 1976	Dec. 28, 1976
B 495,554	3,993,665	Feb. 3, 1976	Nov. 23, 1976	B 504,503	3,999,210	Mar. 9, 1976	Dec. 21, 1976
B 495,759	3,989,998	Feb. 3, 1976	Nov. 2, 1976	B 504,582	4,005,138	Mar. 30, 1976	Jan. 25, 1977
B 495,781	4,013,699	Mar. 23, 1976	Mar. 22, 1977	B 504,778	3,986,650	Feb. 24, 1976	Oct. 19, 1976
B 495,903	3,995,997	Feb. 17, 1976	Dec. 7, 1976	B 504,877	3,997,564	Feb. 24, 1976	Dec. 14, 1976
B 496,430	3,991,140	Feb. 10, 1976	Nov. 9, 1976	B 504,899	3,991,273	Mar. 9, 1976	Nov. 9, 1976
B 496,431	3,985,894	Jan. 13, 1976	Oct. 12, 1976	B 505,126	3,981,745	Feb. 10, 1976	Sep. 21, 1976
B 496,487	3,982,261	Jan. 20, 1976	Sep. 21, 1976	B 505,221	4,013,627	Mar. 30, 1976	Mar. 22, 1977
B 496,500	3,985,962	Feb. 3, 1976	Oct. 12, 1976	B 505,582	4,001,659	Mar. 23, 1976	Jan. 4, 1977
B 496,502	3,987,444	Jan. 20, 1976	Oct. 19, 1976	B 505,689	3,987,631	Mar. 2, 1976	Oct. 26, 1976
B 496,792	3,999,959	Feb. 17, 1976	Dec. 28, 1976	B 505,813	3,985,175	Jan. 13, 1976	Oct. 12, 1976
B 496,964	3,999,219	Apr. 20, 1976	Dec. 21, 1976	B 506,144	3,991,147	Feb. 10, 1976	Nov. 9, 1976
B 496,999	3,983,804	Jan. 27, 1976	Oct. 5, 1976	B 506,148	3,988,319	Feb. 3, 1976	Oct. 26, 1976
B 497,021	3,985,039	Jan. 13, 1976	Oct. 12, 1976	B 506,167	3,990,652	Feb. 10, 1976	Nov. 9, 1976
B 497,194	3,988,267	Feb. 3, 1976	Oct. 26, 1976	B 506,286	3,982,085	Jan. 20, 1976	Sep. 21, 1976
B 497,292	3,994,052	Feb. 3, 1976	Nov. 30, 1976	B 506,461	3,987,348	Jan. 20, 1976	Oct. 19, 1976
B 497,293	4,011,412	Mar. 30, 1976	Mar. 8, 1977	B 506,566	3,985,402	Jan. 20, 1976	Oct. 12, 1976
B 497,473	3,990,839	Feb. 3, 1976	Nov. 9, 1976	B 506,624	3,999,695	Mar. 9, 1976	Dec. 28, 1976
B 497,571	4,009,997	Mar. 23, 1976	Mar. 1, 1977	B 506,648	3,994,857	Feb. 3, 1976	Nov. 30, 1976
B 497,584	3,988,184	Feb. 24, 1976	Oct. 26, 1976	B 506,744	3,981,176	Jan. 13, 1976	Sep. 21, 1976
B 497,702	3,996,589	Mar. 2, 1976	Dec. 7, 1976	B 506,760	4,012,835	Apr. 13, 1976	Mar. 22, 1977
B 497,780	3,997,500	Feb. 24, 1976	Dec. 14, 1976	B 506,839	4,005,389	Mar. 23, 1976	Jan. 25, 1977
B 497,853	3,987,934	Feb. 17, 1976	Oct. 26, 1976	B 506,840	4,002,928	Mar. 23, 1976	Jan. 11, 1977
B 497,896	D 243,091	Apr. 6, 1976	Jan. 18, 1977	B 506,916	3,986,140	Feb. 3, 1976	Oct. 12, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 506,926	3,993,232	Feb. 17, 1976	Nov. 23, 1976
B 507,087	3,991,389	Feb. 17, 1976	Nov. 9, 1976
B 507,131	4,000,499	Mar. 2, 1976	Dec. 28, 1976
B 507,166	4,014,738	Apr. 13, 1976	Mar. 29, 1977
B 507,396	3,995,167	Feb. 10, 1976	Nov. 30, 1976
B 507,476	3,994,680	Feb. 10, 1976	Nov. 30, 1976
B 507,647	3,982,240	Jan. 27, 1976	Sep. 21, 1976
B 508,118	3,992,283	Feb. 17, 1976	Nov. 16, 1976
B 508,119	3,992,285	Feb. 17, 1976	Nov. 16, 1976
B 508,369	3,985,847	Jan. 13, 1976	Oct. 12, 1976
B 508,639	4,004,194	Mar. 23, 1976	Jan. 18, 1977
B 508,817	3,989,891	Feb. 3, 1976	Nov. 2, 1976
B 508,878	3,994,117	Feb. 3, 1976	Nov. 30, 1976
B 508,940	3,981,321	Feb. 17, 1976	Sep. 21, 1976
B 508,961	3,987,477	Feb. 3, 1976	Oct. 19, 1976
B 509,043	3,996,767	Feb. 24, 1976	Dec. 14, 1976
B 509,165	3,999,155	Mar. 2, 1976	Dec. 21, 1976
B 509,185	3,989,996	Feb. 3, 1976	Nov. 2, 1976
B 509,238	3,982,399	Feb. 24, 1976	Sep. 28, 1976
B 509,474	3,997,260	Feb. 17, 1976	Dec. 14, 1976
B 509,586	4,006,645	Feb. 3, 1976	Feb. 8, 1977
B 509,606	3,989,986	Feb. 3, 1976	Nov. 2, 1976
B 509,772	3,999,004	Mar. 16, 1976	Dec. 21, 1976
B 509,819	4,014,712	Apr. 13, 1976	Mar. 29, 1977
B 510,026	4,016,763	Apr. 13, 1976	Apr. 12, 1977
B 510,184	D 242,784	Apr. 6, 1976	Dec. 21, 1976
B 510,278	4,008,972	Mar. 30, 1976	Feb. 22, 1977
B 510,281	3,993,215	Mar. 9, 1976	Nov. 23, 1976
B 510,346	D 242,207	Feb. 10, 1976	Nov. 9, 1976
B 510,458	4,000,221	Feb. 10, 1976	Dec. 28, 1976
B 510,521	3,990,656	Mar. 2, 1976	Nov. 9, 1976
B 510,588	3,981,539	Jan. 27, 1976	Sep. 21, 1976
B 510,677	3,989,541	Feb. 24, 1976	Nov. 2, 1976
B 510,682	4,000,978	Mar. 30, 1976	Jan. 4, 1977
B 510,836	4,013,795	Mar. 23, 1976	Mar. 22, 1977
B 510,850	3,989,841	Feb. 3, 1976	Nov. 2, 1976
B 510,855	3,981,059	Jan. 27, 1976	Sep. 21, 1976
B 511,907	3,999,622	Mar. 30, 1976	Dec. 28, 1976
B 510,998	3,992,336	Feb. 10, 1976	Nov. 16, 1976
B 511,002	3,998,717	Mar. 2, 1976	Dec. 21, 1976
B 511,099	3,990,162	Feb. 3, 1976	Nov. 9, 1976
B 511,156	3,981,364	Jan. 27, 1976	Sep. 21, 1976
B 511,346	3,984,072	Jan. 27, 1976	Oct. 5, 1976
B 511,407	3,981,485	Feb. 10, 1976	Sep. 21, 1976
B 511,454	3,982,333	Feb. 24, 1976	Sep. 28, 1976
B 511,665	4,001,037	Mar. 2, 1976	Jan. 4, 1977
B 511,885	3,981,346	Jan. 27, 1976	Sep. 21, 1976
B 511,886	3,989,991	Feb. 3, 1976	Nov. 2, 1976
B 511,909	3,981,183	Feb. 17, 1976	Sep. 21, 1976
B 512,324	3,985,084	Feb. 17, 1976	Oct. 12, 1976
B 512,547	3,984,193	Jan. 13, 1976	Oct. 5, 1976
B 512,745	3,981,294	Jan. 13, 1976	Sep. 21, 1976
B 512,779	4,014,897	Apr. 13, 1976	Mar. 29, 1977
B 512,818	3,997,363	Apr. 6, 1976	Dec. 14, 1976
B 512,849	3,982,141	Feb. 3, 1976	Sep. 21, 1976
B 512,964	3,995,279	Feb. 10, 1976	Nov. 30, 1976
B 513,014	3,991,113	Feb. 10, 1976	Nov. 9, 1976
B 513,027	3,995,143	Feb. 17, 1976	Nov. 30, 1976
B 513,134	4,006,764	Mar. 23, 1976	Feb. 8, 1977
B 513,280	3,988,211	Jan. 20, 1976	Oct. 26, 1976
B 513,368	3,982,138	Feb. 3, 1976	Sep. 21, 1976
B 513,706	3,986,064	Jan. 13, 1976	Oct. 12, 1976
B 513,756	3,993,869	Feb. 3, 1976	Nov. 23, 1976
B 513,781	4,001,324	Feb. 24, 1976	Jan. 4, 1977
B 513,789	3,981,599	Feb. 3, 1976	Sep. 21, 1976
B 513,791	4,008,608	Mar. 30, 1976	Feb. 22, 1977
B 514,259	4,013,649	Mar. 23, 1976	Mar. 22, 1977
B 514,687	3,986,522	Jan. 27, 1976	Oct. 19, 1976
B 515,135	3,990,085	Feb. 17, 1976	Nov. 2, 1976
B 515,303	3,987,939	Jan. 20, 1976	Oct. 26, 1976
B 515,368	4,014,733	Apr. 6, 1976	Mar. 29, 1977
B 515,452	3,995,243	Feb. 10, 1976	Nov. 30, 1976
B 515,455	3,982,149	Jan. 27, 1976	Sep. 21, 1976
B 515,642	4,001,258	Feb. 24, 1976	Jan. 4, 1977
B 515,908	3,984,676	Jan. 20, 1976	Oct. 5, 1976
B 516,002	3,988,638	Jan. 13, 1976	Oct. 26, 1976
B 516,032	3,986,634	Jan. 27, 1976	Oct. 19, 1976
B 516,047	3,985,741	Feb. 10, 1976	Oct. 12, 1976
B 516,060	3,983,572	Feb. 17, 1976	Sep. 28, 1976
B 516,069	3,986,208	Mar. 16, 1976	Oct. 12, 1976
B 516,296	3,984,404	Feb. 3, 1976	Oct. 5, 1976
B 516,537	3,996,784	Feb. 17, 1976	Dec. 14, 1976
B 516,564	3,993,931	Feb. 17, 1976	Nov. 23, 1976
B 516,609	3,994,486	Feb. 24, 1976	Nov. 30, 1976
B 516,625	4,013,542	Mar. 30, 1976	Mar. 22, 1977
B 516,804	3,991,209	Mar. 23, 1976	Nov. 9, 1976
B 516,825	3,988,885	Feb. 3, 1976	Nov. 2, 1976
B 517,273	D 242,798	Mar. 16, 1976	Dec. 21, 1976
B 517,504	3,999,855	Mar. 9, 1976	Dec. 28, 1976
B 517,668	4,013,423	Apr. 6, 1976	Mar. 22, 1977
B 517,762	3,986,065	Mar. 16, 1976	Oct. 12, 1976
B 517,858	4,000,999	Feb. 17, 1976	Jan. 4, 1977
B 517,956	D 243,088	Apr. 6, 1976	Jan. 18, 1977
B 517,957	D 243,089	Apr. 6, 1976	Jan. 18, 1977
B 518,076	4,014,914	Mar. 30, 1976	Mar. 29, 1977
B 518,226	3,993,509	Feb. 10, 1976	Nov. 23, 1976
B 518,326	4,008,282	Mar. 23, 1976	Feb. 15, 1977
B 518,656	3,989,732	Feb. 17, 1976	Nov. 2, 1976
B 518,859	3,989,971	Feb. 3, 1976	Nov. 2, 1976
B 518,999	3,990,323	Feb. 3, 1976	Nov. 9, 1976
B 519,095	3,993,621	Feb. 24, 1976	Nov. 23, 1976
B 519,355	4,014,829	Apr. 13, 1976	Mar. 29, 1977
B 519,377	3,987,223	Jan. 27, 1976	Oct. 19, 1976
B 519,446	3,985,815	Feb. 24, 1976	Oct. 12, 1976
B 519,485	3,991,134	Feb. 10, 1976	Nov. 9, 1976
B 519,486	3,992,481	Feb. 17, 1976	Nov. 16, 1976
B 519,487	3,992,337	Feb. 17, 1976	Nov. 16, 1976
B 519,599	3,995,350	Feb. 17, 1976	Dec. 7, 1976
B 519,623	4,012,049	Apr. 6, 1976	Mar. 15, 1977
B 519,680	4,014,660	Mar. 30, 1976	Mar. 29, 1977
B 519,932	3,988,618	Feb. 3, 1976	Oct. 26, 1976
B 519,979	3,982,067	Feb. 3, 1976	Sep. 21, 1976
B 520,063	3,989,934	Mar. 2, 1976	Nov. 2, 1976
B 520,075	3,989,935	Feb. 24, 1976	Nov. 2, 1976
B 520,076	3,989,936	Mar. 2, 1976	Nov. 2, 1976
B 520,082	3,989,937	Mar. 23, 1976	Nov. 2, 1976
B 520,115	4,003,072	Mar. 23, 1976	Jan. 11, 1977
B 520,227	4,002,823	Mar. 30, 1976	Jan. 11, 1977
B 520,256	3,985,730	Jan. 13, 1976	Oct. 12, 1976
B 520,277	3,995,635	Feb. 17, 1976	Dec. 7, 1976
B 520,341	3,992,028	Mar. 16, 1976	Nov. 16, 1976
B 520,384	3,986,592	Jan. 27, 1976	Oct. 19, 1976
B 520,514	3,988,308	Mar. 9, 1976	Oct. 26, 1976
B 520,534	3,997,119	Feb. 17, 1976	Dec. 14, 1976
B 520,543	3,986,768	Jan. 27, 1976	Oct. 19, 1976
B 520,546	4,001,133	Mar. 2, 1976	Jan. 4, 1977
B 520,613	3,991,341	Mar. 16, 1976	Nov. 9, 1976
B 520,658	3,998,778	Mar. 9, 1976	Dec. 21, 1976
B 520,878	4,014,849	Apr. 6, 1976	Mar. 29, 1977
B 520,884	4,000,433	Mar. 16, 1976	Dec. 28, 1976
B 520,924	3,982,113	Jan. 27, 1976	Sep. 21, 1976
J 520,928	3,983,617	Jan. 13, 1976	Oct. 5, 1976
B 520,952	4,000,876	Mar. 16, 1976	Jan. 4, 1977
B 520,995	4,009,996	Mar. 23, 1976	Mar. 1, 1977
B 521,025	3,998,838	Mar. 23, 1976	Dec. 21, 1976
B 521,044	3,983,435	Feb. 24, 1976	Sep. 28, 1976
B 521,045	3,983,433	Feb. 24, 1976	Sep. 28, 1976
B 521,046	3,983,434	Feb. 24, 1976	Sep. 28, 1976
b 521,125	3,994,865	Feb. 10, 1976	Nov. 30, 1976
B 521,126	3,997,510	Feb. 10, 1976	Dec. 14, 1976
B 521,127	3,996,201	Feb. 17, 1976	Dec. 7, 1976
B 521,128	3,997,511	Feb. 10, 1976	Dec. 14, 1976
B 521,324	3,983,143	Jan. 27, 1976	Sep. 28, 1976
B 521,480	3,982,665	Jan. 13, 1976	Sep. 28, 1976
B 521,600	3,981,458	Jan. 27, 1976	Sep. 21, 1976
B 521,612	4,000,251	Mar. 9, 1976	Dec. 28, 1976
B 521,620	3,983,749	Jan. 27, 1976	Oct. 5, 1976
B 521,643	3,997,567	Mar. 2, 1976	Dec. 14, 1976
B 521,711	3,989,835	Feb. 10, 1976	Nov. 2, 1976
B 521,793	3,996,981	Feb. 24, 1976	Dec. 14, 1976
B 521,984	3,983,220	Feb. 17, 1976	Sep. 28, 1976
B 521,985	4,012,404	Mar. 23, 1976	Mar. 15, 1977
B 521,986	3,981,607	Feb. 3, 1976	Sep. 21, 1976
B 522,009	3,995,444	Feb. 17, 1976	Dec. 7, 1976
B 522,038	3,993,119	Feb. 3, 1976	Nov. 23, 1976
B 522,227	3,992,904	Mar. 30, 1976	Nov. 23, 1976
B 522,309	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 522,354	3,984,959	Jan. 20, 1976	Oct. 12, 1976
B 522,446	4,001,194	Mar. 30, 1976	Jan. 4, 1977
B 522,537	3,999,587	Mar. 30, 1976	Dec. 28, 1976
B 522,567	3,996,238	Feb. 17, 1976	Dec. 7, 1976
B 522,568	D 242,785	Apr. 6, 1976	Dec. 21, 1976
B 522,577	3,982,123	Jan. 27, 1976	Sep. 21, 1976
B 522,629	4,001,155	Mar. 16, 1976	Jan. 4, 1977
B 523,226	4,006,367	Mar. 23, 1976	Feb. 1, 1977
B 523,696	3,986,071	Jan. 13, 1976	Oct. 12, 1976
B 523,885	3,981,040	Feb. 17, 1976	Sep. 21, 1976
B 523,952	3,988,707	Mar. 23, 1976	Oct. 26, 1976
B 524,026	3,992,206	Feb. 10, 1976	Nov. 16, 1976
B 524,121	3,982,536	Feb. 3, 1976	Sep. 28, 1976
B 524,179	3,985,872	Jan. 13, 1976	Oct. 12, 1976
B 524,464	3,985,580	Feb. 10, 1976	Oct. 12, 1976
B 524,806	4,000,065	Mar. 2, 1976	Dec. 28, 1976
B 524,849	4,014,938	Mar. 23, 1976	Mar. 29, 1977

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 525,133	3,996,481	Mar. 23, 1976	Dec. 7, 1976
B 525,204	4,001,109	Mar. 16, 1976	Jan. 4, 1977
B 525,809	3,985,040	Feb. 24, 1976	Oct. 12, 1976
B 525,961	3,985,557	Jan. 13, 1976	Oct. 12, 1976
B 526,106	3,990,073	Jan. 27, 1976	Nov. 2, 1976
B 526,190	3,982,129	Feb. 17, 1976	Sep. 21, 1976
B 526,279	4,013,138	Apr. 13, 1976	Mar. 22, 1977
B 526,289	3,992,641	Feb. 24, 1976	Nov. 16, 1976
B 526,388	3,992,017	Feb. 3, 1976	Nov. 16, 1976
B 526,445	3,984,978	Jan. 20, 1976	Oct. 12, 1976
B 526,447	4,000,052	Feb. 24, 1976	Dec. 28, 1976
B 526,510	3,989,708	Jan. 20, 1976	Nov. 2, 1976
B 526,654	4,011,534	Mar. 23, 1976	Mar. 8, 1977
B 526,942	4,013,700	Mar. 30, 1976	Mar. 22, 1977
B 526,997	3,985,695	Jan. 13, 1976	Oct. 12, 1976
B 527,040	4,013,515	Mar. 23, 1976	Mar. 22, 1977
B 527,054	3,981,559	Feb. 17, 1976	Sep. 21, 1976
B 527,171	3,998,248	Mar. 9, 1976	Dec. 21, 1976
B 527,187	3,995,202	Feb. 17, 1976	Nov. 30, 1976
B 527,333	3,999,732	Mar. 23, 1976	Dec. 28, 1976
B 527,669	3,982,206	Jan. 13, 1976	Sep. 21, 1976
B 527,693	3,995,233	Feb. 3, 1976	Nov. 30, 1976
B 527,788	D 242,337	Feb. 10, 1976	Nov. 16, 1976
B 527,972	4,000,016	Mar. 9, 1976	Dec. 28, 1976
B 527,999	3,981,682	Feb. 3, 1976	Sep. 21, 1976
B 528,297	4,001,138	Mar. 16, 1976	Jan. 4, 1977
B 528,303	3,991,023	Feb. 10, 1976	Nov. 9, 1976
B 528,401	3,991,619	Feb. 3, 1976	Nov. 16, 1976
B 528,756	3,990,476	Feb. 3, 1976	Nov. 9, 1976
B 528,761	3,982,221	Feb. 10, 1976	Sep. 21, 1976
B 528,962	3,989,666	Feb. 24, 1976	Nov. 2, 1976
B 528,966	3,989,667	Feb. 24, 1976	Nov. 2, 1976
B 529,156	3,989,158	Jan. 13, 1976	Nov. 2, 1976
B 529,194	4,000,776	Mar. 23, 1976	Jan. 4, 1977
B 529,214	4,013,004	Apr. 20, 1976	Mar. 22, 1977
B 529,659	3,996,875	Feb. 24, 1976	Dec. 14, 1976
B 529,836	3,994,345	Feb. 3, 1976	Nov. 30, 1976
B 529,925	4,014,003	Mar. 30, 1976	Mar. 22, 1977
B 529,974	3,987,098	Feb. 17, 1976	Oct. 19, 1976
B 530,174	3,993,635	Feb. 24, 1976	Nov. 23, 1976
B 530,255	3,996,103	Mar. 2, 1976	Dec. 7, 1976
B 530,263	4,009,736	Mar. 30, 1976	Mar. 1, 1977
B 530,285	4,013,903	Apr. 6, 1976	Mar. 22, 1977
B 530,303	4,006,029	Mar. 23, 1976	Feb. 1, 1977
B 530,318	3,985,752	Jan. 13, 1976	Oct. 12, 1976
B 530,437	4,014,857	Apr. 13, 1976	Mar. 29, 1977
B 530,569	3,999,865	Mar. 16, 1976	Dec. 28, 1976
B 530,580	4,001,151	Mar. 2, 1976	Jan. 4, 1977
B 530,605	3,989,064	Feb. 3, 1976	Nov. 2, 1976
B 530,709	4,012,944	Apr. 6, 1976	Mar. 22, 1977
B 530,813	3,986,131	Feb. 17, 1976	Oct. 12, 1976
B 530,873	4,001,016	Feb. 17, 1976	Jan. 4, 1977
B 530,925	3,983,161	Feb. 24, 1976	Sep. 28, 1976
B 531,096	3,984,415	Feb. 10, 1976	Oct. 5, 1976
B 531,267	3,997,040	Feb. 24, 1976	Dec. 14, 1976
B 531,425	3,992,595	Feb. 3, 1976	Nov. 16, 1976
B 531,566	3,997,820	Mar. 16, 1976	Dec. 14, 1976
B 531,686	3,990,017	Mar. 23, 1976	Nov. 2, 1976
B 531,753	3,988,843	Mar. 2, 1976	Nov. 2, 1976
B 531,929	3,986,067	Jan. 20, 1976	Oct. 12, 1976
B 532,005	3,992,397	Feb. 24, 1976	Nov. 16, 1976
B 532,140	4,001,299	Mar. 2, 1976	Jan. 4, 1977
B 532,319	3,990,292	Feb. 3, 1976	Nov. 9, 1976
B 532,326	3,993,959	Mar. 23, 1976	Nov. 23, 1976
B 532,424	D 242,292	Feb. 10, 1976	Nov. 9, 1976
B 532,476	3,992,756	Feb. 3, 1976	Nov. 23, 1976
B 532,477	4,014,895	Apr. 13, 1976	Mar. 29, 1977
B 532,679	4,010,706	Apr. 6, 1976	Mar. 8, 1977
B 532,901	3,984,318	Jan. 13, 1976	Oct. 5, 1976
B 532,969	3,981,706	Jan. 13, 1976	Sep. 21, 1976
B 532,976	4,000,837	Mar. 23, 1976	Jan. 4, 1977
B 533,056	3,983,969	Jan. 13, 1976	Oct. 5, 1976
B 533,259	3,999,556	Feb. 24, 1976	Dec. 28, 1976
B 533,454	3,996,566	Mar. 2, 1976	Dec. 7, 1976
B 533,580	3,982,255	Feb. 3, 1976	Sep. 21, 1976
B 533,652	4,000,196	Mar. 23, 1976	Dec. 28, 1976
B 533,734	3,984,799	Jan. 27, 1976	Oct. 5, 1976
B 533,968	3,986,576	Jan. 27, 1976	Oct. 19, 1976
B 534,016	3,983,381	Feb. 3, 1976	Sep. 28, 1976
B 534,313	3,981,675	Jan. 27, 1976	Sep. 21, 1976
B 534,314	3,981,786	Feb. 10, 1976	Sep. 21, 1976
B 534,333	3,981,480	Feb. 17, 1976	Sep. 21, 1976
B 534,334	D 242,722	Mar. 16, 1976	Dec. 14, 1976
B 534,443	3,989,970	Jan. 27, 1976	Nov. 2, 1976
B 534,574	3,995,624	Feb. 24, 1976	Dec. 7, 1976
B 534,591	3,991,141	Feb. 17, 1976	Nov. 9, 1976
B 534,680	4,014,904	Apr. 20, 1976	Mar. 29, 1977
B 534,767	3,982,180	Feb. 3, 1976	Sep. 21, 1976
B 534,915	4,012,668	Mar. 23, 1976	Mar. 15, 1977
B 534,991	3,983,517	Jan. 27, 1976	Sep. 28, 1976
B 535,076	3,981,718	Jan. 20, 1976	Sep. 21, 1976
B 535,209	4,001,873	Mar. 16, 1976	Jan. 4, 1977
B 535,256	3,999,150	Mar. 23, 1976	Dec. 21, 1976
B 535,268	3,999,045	Mar. 30, 1976	Dec. 21, 1976
B 535,386	3,981,150	Jan. 13, 1976	Sep. 21, 1976
B 535,391	3,981,386	Jan. 27, 1976	Sep. 21, 1976
B 535,411	3,990,543	Feb. 24, 1976	Nov. 9, 1976
B 535,437	3,997,555	Feb. 24, 1976	Dec. 14, 1976
B 535,448	3,997,123	Mar. 16, 1976	Dec. 14, 1976
B 535,466	3,981,309	Jan. 27, 1976	Sep. 21, 1976
B 535,813	3,981,819	Jan. 27, 1976	Sep. 21, 1976
B 535,928	3,981,466	Jan. 13, 1976	Sep. 21, 1976
B 536,009	3,982,112	Jan. 27, 1976	Sep. 21, 1976
B 536,082	3,997,783	Mar. 16, 1976	Dec. 14, 1976
B 536,322	4,001,272	Mar. 23, 1976	Jan. 4, 1977
B 536,403	3,998,341	Mar. 23, 1976	Dec. 21, 1976
B 536,511	3,995,989	Mar. 9, 1976	Dec. 7, 1976
B 536,675	3,985,773	Jan. 20, 1976	Oct. 12, 1976
B 536,923	4,007,828	Mar. 30, 1976	Feb. 15, 1977
B 536,935	3,985,729	Jan. 13, 1976	Oct. 12, 1976
B 537,058	4,000,969	Mar. 23, 1976	Jan. 4, 1977
B 537,102	3,981,829	Jan. 13, 1976	Sep. 21, 1976
B 537,709	3,981,368	Jan. 13, 1976	Sep. 21, 1976
B 537,711	3,985,748	Jan. 13, 1976	Oct. 12, 1976
B 537,722	3,985,423	Feb. 3, 1976	Oct. 12, 1976
B 537,903	3,986,492	Jan. 20, 1976	Oct. 19, 1976
B 538,472	3,992,884	Feb. 3, 1976	Nov. 23, 1976
B 538,491	3,982,928	Feb. 17, 1976	Sep. 28, 1976
B 538,686	3,982,199	Jan. 13, 1976	Sep. 21, 1976
B 538,753	3,993,642	Feb. 10, 1976	Nov. 23, 1976
B 539,374	3,996,229	Mar. 9, 1976	Dec. 7, 1976
B 539,746	3,983,423	Feb. 17, 1976	Sep. 28, 1976
B 540,078	3,984,701	Jan. 13, 1976	Oct. 5, 1976
B 540,218	3,986,108	Feb. 10, 1976	Oct. 12, 1976
B 540,632	3,981,600	Jan. 13, 1976	Sep. 21, 1976
B 540,703	4,013,206	Apr. 13, 1976	Mar. 22, 1977
B 540,767	3,986,010	Mar. 16, 1976	Oct. 12, 1976
B 540,872	3,982,135	Jan. 20, 1976	Sep. 21, 1976
B 540,888	4,005,528	Mar. 30, 1976	Feb. 1, 1977
B 541,015	3,993,208	Jan. 27, 1976	Nov. 23, 1976
B 541,376	3,981,690	Feb. 17, 1976	Sep. 21, 1976
B 541,415	3,982,080	Feb. 3, 1976	Sep. 21, 1976
B 541,464	3,995,424	Feb. 17, 1976	Dec. 7, 1976
B 541,496	3,982,232	Jan. 27, 1976	Sep. 21, 1976
B 541,501	4,005,826	Apr. 13, 1976	Feb. 1, 1977
B 541,517	3,986,156	Jan. 13, 1976	Oct. 12, 1976
B 541,710	3,994,472	Feb. 24, 1976	Nov. 30, 1976
B 542,135	3,986,939	Feb. 10, 1976	Oct. 19, 1976
B 542,158	3,981,886	Jan. 13, 1976	Sep. 21, 1976
B 542,226	3,993,748	Feb. 24, 1976	Nov. 23, 1976
B 542,258	4,013,536	Mar. 23, 1976	Mar. 22, 1977
B 543,078	3,995,687	Feb. 17, 1976	Dec. 7, 1976
B 543,941	3,985,528	Jan. 13, 1976	Oct. 12, 1976
B 544,034	3,997,175	Feb. 17, 1976	Dec. 14, 1976
B 544,476	3,993,585	Feb. 24, 1976	Nov. 23, 1976
B 544,899	3,994,962	Feb. 17, 1976	Nov. 30, 1976
B 544,961	3,983,492	Jan. 13, 1976	Sep. 28, 1976
B 545,050	3,982,073	Jan. 20, 1976	Sep. 21, 1976
B 545,265	D 243,090	Apr. 13, 1976	Jan. 18, 1977
B 545,299	4,001,259	Feb. 24, 1976	Jan. 4, 1977
B 545,344	4,012,746	Mar. 30, 1976	Mar. 15, 1977
B 545,464	3,992,387	Feb. 10, 1976	Nov. 16, 1976
B 545,630	3,981,337	Jan. 27, 1976	Sep. 21, 1976
B 545,777	4,004,906	Jan. 27, 1976	Jan. 25, 1977
B 545,856	4,006,939	Mar. 30, 1976	Feb. 8, 1977
B 545,935	3,990,337	Jan. 27, 1976	Nov. 9, 1976
B 545,945	3,995,260	Jan. 27, 1976	Nov. 30, 1976
B 546,097	3,999,309	Mar. 23, 1976	Dec. 28, 1976
B 546,295	3,987,070	Jan. 20, 1976	Oct. 19, 1976
B 546,426	3,982,063	Jan. 27, 1976	Sep. 21, 1976
B 546,631	3,983,729	Feb. 3, 1976	Oct. 5, 1976
B 546,665	3,990,062	Jan. 20, 1976	Nov. 2, 1976
B 546,677	4,015,654	Apr. 6, 1976	Apr. 5, 1977
B 546,911	3,981,058	Jan. 13, 1976	Sep. 21, 1976
B 546,922	3,987,742	Mar. 16, 1976	Oct. 26, 1976
B 547,016	3,999,741	Mar. 23, 1976	Dec. 28, 1976
B 547,208	4,001,218	Feb. 24, 1976	Jan. 4, 1977
B 547,547	3,997,670	Feb. 24, 1976	Dec. 14, 1976
B 547,994	3,990,081	Jan. 20, 1976	Nov. 2, 1976
B 548,028	3,991,517	Feb. 3, 1976	Nov. 16, 1976
B 548,058	3,983,050	Feb. 17, 1976	Sep. 28, 1976
B 548,155	3,981,477	Jan. 13, 1976	Sep. 21, 1976
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 548,302	3,983,414	Feb. 17, 1976	Sep. 28, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 548,462	D 242,283	Feb. 10, 1976	Nov. 9, 1976
B 548,688	3,995,984	Mar. 9, 1976	Dec. 7, 1976
B 548,719	3,990,553	Feb. 17, 1976	Nov. 9, 1976
B 548,978	3,998,139	Mar. 9, 1976	Dec. 21, 1976
B 549,198	3,981,975	Jan. 13, 1976	Sep. 21, 1976
B 549,244	3,981,125	Jan. 27, 1976	Sep. 21, 1976
B 549,394	3,981,611	Jan. 27, 1976	Sep. 21, 1976
B 549,931	3,986,141	Jan. 20, 1976	Oct. 12, 1976
B 549,964	3,995,899	Feb. 24, 1976	Dec. 7, 1976
B 550,693	3,982,194	Jan. 20, 1976	Sep. 21, 1976
B 550,744	3,993,550	Feb. 17, 1976	Nov. 23, 1976
B 550,810	4,000,910	Mar. 23, 1976	Jan. 4, 1977
B 551,133	3,996,740	Mar. 2, 1976	Dec. 14, 1976
B 551,463	3,996,254	Feb. 17, 1976	Dec. 7, 1976
B 551,527	3,982,599	Jan. 13, 1976	Sep. 28, 1976
B 551,809	3,996,743	Feb. 24, 1976	Dec. 14, 1976
B 551,952	Re. 29,059	Mar. 2, 1976	Dec. 7, 1976
B 552,006	3,992,129	Feb. 3, 1976	Nov. 16, 1976
B 552,489	3,994,864	Feb. 10, 1976	Nov. 30, 1976
B 552,498	3,983,139	Jan. 13, 1976	Sep. 28, 1976
B 552,508	4,001,250	Mar. 16, 1976	Jan. 4, 1977
B 552,629	3,994,773	Mar. 23, 1976	Nov. 30, 1976
B 552,709	4,001,467	Mar. 23, 1976	Jan. 4, 1977
B 552,932	3,989,292	Feb. 3, 1976	Nov. 2, 1976
B 553,421	4,001,146	Mar. 23, 1976	Jan. 4, 1977
B 553,460	3,990,019	Feb. 3, 1976	Nov. 2, 1976
B 553,584	3,992,456	Feb. 17, 1976	Nov. 16, 1976
B 553,629	3,999,242	Feb. 24, 1976	Dec. 28, 1976
B 554,039	3,999,944	Feb. 24, 1976	Dec. 28, 1976
B 554,164	4,001,465	Mar. 9, 1976	Jan. 4, 1977
B 554,283	3,981,152	Jan. 27, 1976	Sep. 21, 1976
B 554,291	4,001,209	Mar. 9, 1976	Jan. 4, 1977
B 554,380	4,001,147	Mar. 9, 1976	Jan. 4, 1977
B 554,594	3,985,960	Jan. 20, 1976	Oct. 12, 1976
B 554,655	4,015,048	Feb. 24, 1976	Mar. 29, 1977
B 554,848	4,001,265	Feb. 24, 1976	Jan. 4, 1977
B 554,939	3,994,013	Feb. 10, 1976	Nov. 23, 1976
B 555,146	4,007,636	Apr. 20, 1976	Feb. 15, 1977
B 555,437	3,991,152	Feb. 3, 1976	Nov. 9, 1976
B 555,456	3,993,423	Mar. 30, 1976	Nov. 23, 1976
B 555,772	3,982,641	Jan. 13, 1976	Sep. 28, 1976
B 556,057	3,985,349	Jan. 13, 1976	Oct. 12, 1976
B 556,496	3,990,244	Mar. 16, 1976	Nov. 9, 1976
B 556,897	3,992,972	Feb. 3, 1976	Nov. 23, 1976
B 557,153	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 557,274	4,016,375	Mar. 23, 1976	Apr. 5, 1977
B 557,299	3,990,357	Feb. 3, 1976	Nov. 9, 1976
B 557,621	3,990,800	Feb. 3, 1976	Nov. 9, 1976
B 557,721	4,013,435	Mar. 23, 1976	Mar. 22, 1977
B 557,856	3,991,019	Feb. 10, 1976	Nov. 9, 1976
B 558,220	3,990,009	Jan. 27, 1976	Nov. 2, 1976
B 558,251	3,981,289	Jan. 13, 1976	Sep. 21, 1976
B 558,813	3,989,188	Feb. 3, 1976	Nov. 2, 1976
B 558,818	3,983,762	Jan. 13, 1976	Oct. 5, 1976
B 558,819	3,990,160	Feb. 3, 1976	Nov. 9, 1976
B 558,973	3,981,126	Feb. 10, 1976	Sep. 21, 1976
B 559,111	3,984,854	Feb. 24, 1976	Oct. 5, 1976
B 559,142	4,001,124	Mar. 2, 1976	Jan. 4, 1977
B 559,394	4,016,094	Apr. 20, 1976	Apr. 5, 1977
B 559,441	4,013,609	Mar. 23, 1976	Mar. 22, 1977
B 559,631	4,011,406	Mar. 23, 1976	Mar. 8, 1977
B 559,697	3,995,770	Mar. 16, 1976	Dec. 7, 1976
B 559,700	4,001,189	Mar. 23, 1976	Jan. 4, 1977
B 559,701	4,001,190	Mar. 23, 1976	Jan. 4, 1977
B 559,737	3,984,668	Jan. 20, 1976	Oct. 5, 1976
B 559,954	3,982,673	Feb. 3, 1976	Sep. 28, 1976
B 560,261	3,987,493	Mar. 16, 1976	Oct. 19, 1976
B 560,488	3,989,940	Mar. 16, 1976	Nov. 2, 1976
B 560,717	3,982,034	Feb. 10, 1976	Sep. 21, 1976
B 560,765	3,983,389	Feb. 3, 1976	Sep. 28, 1976
B 561,062	D 242,248	Feb. 10, 1976	Nov. 9, 1976
B 561,165	4,013,002	Mar. 30, 1976	Mar. 22, 1977
B 561,166	4,011,809	Mar. 30, 1976	Mar. 15, 1977
B 561,365	4,005,078	Apr. 13, 1976	Jan. 25, 1977
B 561,387	3,985,706	Feb. 10, 1976	Oct. 12, 1976
B 561,405	4,003,770	Mar. 30, 1976	Jan. 18, 1977
B 561,712	3,992,126	Feb. 17, 1976	Nov. 16, 1976
B 561,732	3,991,460	Feb. 3, 1976	Nov. 16, 1976
B 561,764	3,984,634	Jan. 27, 1976	Oct. 5, 1976
B 561,770	4,000,366	Mar. 16, 1976	Dec. 28, 1976
B 561,784	3,984,710	Jan. 27, 1976	Oct. 5, 1976
B 562,413	4,000,930	Mar. 16, 1976	Jan. 4, 1977
B 562,462	3,985,836	Jan. 13, 1976	Oct. 12, 1976
B 562,519	4,013,125	Mar. 30, 1976	Mar. 22, 1977
B 562,601	3,998,360	Mar. 16, 1976	Dec. 21, 1976
B 562,698	3,983,972	Jan. 13, 1976	Oct. 5, 1976
B 562,813	3,985,491	Feb. 3, 1976	Oct. 12, 1976
B 563,070	3,996,230	Mar. 9, 1976	Dec. 7, 1976
B 563,165	4,000,977	Mar. 9, 1976	Jan. 4, 1977
B 563,244	3,983,562	Jan. 27, 1976	Sep. 28, 1976
B 563,301	3,995,589	Feb. 17, 1976	Dec. 7, 1976
B 563,412	3,992,127	Feb. 24, 1976	Nov. 16, 1976
B 563,419	3,999,051	Mar. 23, 1976	Dec. 21, 1976
B 563,722	3,990,925	Jan. 13, 1976	Nov. 9, 1976
B 563,780	3,987,769	Feb. 3, 1976	Oct. 26, 1976
B 563,932	4,000,638	Mar. 23, 1976	Jan. 4, 1977
B 564,252	4,001,293	Mar. 2, 1976	Jan. 4, 1977
B 564,255	4,015,996	Mar. 30, 1976	Apr. 5, 1977
B 564,314	3,984,996	Jan. 20, 1976	Oct. 12, 1976
B 564,902	4,001,351	Mar. 23, 1976	Jan. 4, 1977
B 565,180	3,981,685	Jan. 27, 1976	Sep. 21, 1976
B 565,275	3,990,299	Apr. 6, 1976	Nov. 9, 1976
B 565,717	3,999,138	Apr. 13, 1976	Dec. 21, 1976
B 565,754	4,011,626	Mar. 30, 1976	Mar. 15, 1977
B 566,464	3,996,367	Feb. 3, 1976	Dec. 7, 1976
B 566,556	3,998,511	Mar. 23, 1976	Dec. 21, 1976
B 566,572	3,988,590	Mar. 16, 1976	Oct. 26, 1976
B 566,585	4,001,083	Mar. 2, 1976	Jan. 4, 1977
B 567,058	3,985,188	Jan. 13, 1976	Oct. 12, 1976
B 567,076	4,011,187	Mar. 23, 1976	Mar. 8, 1977
B 567,158	3,988,073	Mar. 23, 1976	Oct. 26, 1976
B 567,207	3,991,689	Apr. 13, 1976	Nov. 16, 1976
B 567,435	3,995,724	Feb. 3, 1976	Dec. 7, 1976
B 567,854	3,985,038	Feb. 3, 1976	Oct. 12, 1976
B 567,892	4,000,855	Mar. 16, 1976	Jan. 4, 1977
B 568,226	3,992,698	Feb. 24, 1976	Nov. 16, 1976
B 568,770	3,982,213	Feb. 10, 1976	Sep. 21, 1976
B 569,125	3,986,980	Feb. 24, 1976	Oct. 19, 1976
B 569,293	4,004,149	Mar. 30, 1976	Jan. 18, 1977
B 569,501	3,999,250	Mar. 9, 1976	Dec. 28, 1976
B 569,519	3,993,133	Feb. 3, 1976	Nov. 23, 1976
B 569,646	3,985,222	Jan. 13, 1976	Oct. 12, 1976
B 569,859	3,994,160	Mar. 9, 1976	Nov. 30, 1976
B 570,172	3,987,763	Feb. 3, 1976	Oct. 26, 1976
B 570,615	3,998,570	Mar. 23, 1976	Dec. 21, 1976
B 570,862	3,991,639	Feb. 24, 1976	Nov. 16, 1976
B 571,219	3,991,388	Feb. 24, 1976	Nov. 9, 1976
B 571,638	4,001,244	Mar. 9, 1976	Jan. 4, 1977
B 571,659	3,995,186	Apr. 13, 1976	Nov. 30, 1976
B 572,642	3,990,715	Feb. 10, 1976	Nov. 9, 1976
B 572,726	4,015,020	Feb. 24, 1976	Mar. 29, 1977
B 573,033	3,995,224	Mar. 23, 1976	Nov. 30, 1976
B 573,114	4,014,843	Apr. 6, 1976	Mar. 29, 1977
B 573,991	4,013,704	Mar. 30, 1976	Mar. 22, 1977
B 573,994	4,000,641	Mar. 23, 1976	Jan. 4, 1977
B 574,128	3,982,961	Feb. 17, 1976	Sep. 28, 1976
B 574,616	4,000,424	Mar. 2, 1976	Dec. 28, 1976
B 574,996	3,989,718	Feb. 17, 1976	Nov. 2, 1976
B 575,583	4,000,928	Mar. 16, 1976	Jan. 4, 1977
B 575,757	3,981,170	Jan. 27, 1976	Sep. 21, 1976
B 575,761	4,013,123	Apr. 13, 1976	Mar. 22, 1977
B 575,776	4,013,124	Apr. 20, 1976	Mar. 22, 1977
B 575,851	3,985,826	Feb. 10, 1976	Oct. 12, 1976
B 576,385	4,009,498	Mar. 30, 1976	Mar. 1, 1977
B 576,859	3,991,526	Feb. 24, 1976	Nov. 16, 1976
B 576,903	3,995,032	Feb. 3, 1976	Nov. 30, 1976
B 578,447	3,982,658	Jan. 20, 1976	Sep. 28, 1976
B 579,104	3,982,081	Jan. 27, 1976	Sep. 21, 1976
B 579,116	3,986,227	Feb. 3, 1976	Oct. 19, 1976
B 579,153	4,013,745	Mar. 30, 1976	Mar. 22, 1977
B 579,806	3,995,318	Feb. 3, 1976	Nov. 30, 1976
B 580,379	4,000,796	Apr. 6, 1976	Jan. 4, 1977
B 580,826	3,988,391	Feb. 17, 1976	Oct. 26, 1976
B 580,921	3,984,054	Jan. 13, 1976	Oct. 5, 1976
B 581,843	4,000,562	Mar. 16, 1976	Jan. 4, 1977
B 583,051	3,990,714	Feb. 3, 1976	Nov. 9, 1976
B 583,089	3,982,174	Jan. 27, 1976	Sep. 21, 1976
B 583,712	3,995,064	Feb. 10, 1976	Nov. 30, 1976
B 584,520	3,981,149	Jan. 27, 1976	Sep. 21, 1976
B 584,997	4,000,030	Mar. 9, 1976	Dec. 28, 1976
B 585,247	3,989,914	Feb. 3, 1976	Nov. 2, 1976
B 585,731	3,993,603	Feb. 3, 1976	Nov. 23, 1976
B 586,215	3,985,302	Jan. 20, 1976	Oct. 12, 1976
B 586,380	3,983,885	Mar. 2, 1976	Oct. 5, 1976
B 586,387	3,981,311	Feb. 3, 1976	Sep. 21, 1976
B 586,663	3,992,080	Feb. 3, 1976	Nov. 16, 1976
B 587,118	Re. 29,067	Mar. 2, 1976	Dec. 7, 1976
B 587,786	3,991,204	Feb. 17, 1976	Nov. 9, 1976
B 587,936	3,999,052	Mar. 23, 1976	Dec. 21, 1976
B 589,179	4,001,102	Mar. 23, 1976	Jan. 4, 1977
B 589,687	3,995,349	Mar. 23, 1976	Dec. 7, 1976
B 589,966	3,985,828	Feb. 17, 1976	Oct. 12, 1976
B 590,158	3,985,163	Feb. 10, 1976	Oct. 12, 1976

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B 590,502	4,001,171	Mar. 23, 1976	Jan. 4, 1977	B 597,410	4,000,925	Mar. 30, 1976	Jan. 4, 1977
B 591,141	4,013,631	Mar. 23, 1976	Mar. 22, 1977	B 657,438	3,985,701	Jan. 20, 1976	Oct. 12, 1976
B 592,143	3,984,713	Jan. 27, 1976	Oct. 5, 1976	B 747,785	3,981,899	Feb. 10, 1976	Sep. 21, 1976
B 592,146	4,001,084	Mar. 2, 1976	Jan. 4, 1977	B 750,679	4,007,049	Mar. 23, 1976	Feb. 8, 1977
B 592,658	4,001,164	Mar. 23, 1976	Jan. 4, 1977	B 843,038	3,981,785	Feb. 3, 1976	Sep. 21, 1976
B 593,781	4,015,953	Mar. 16, 1976	Apr. 5, 1977	B 845,044	4,001,338	Mar. 30, 1976	Jan. 4, 1977
B 594,871	3,999,245	Mar. 16, 1976	Dec. 28, 1976	B 848,336	3,993,752	Mar. 30, 1976	Nov. 23, 1976

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Dajani, Mahmoud T., to Nalco Chemical Company. Water clarification process. Re. 29,241, Cl. 210-54.000.

Dimitri, Mitchell S.; and Falkehag, Sten I., to Westvaco Corporation. Composites of lignin and biologically active materials. Re. 29,238, Cl. 71-101.000.

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Hyner, Jacob; and Michelson, Robert A., to Whyco Chromium Company Inc. Ternary alloys. Re. 29,239, Cl. 75-175.00R.

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Kranenberg, Helmut, to Bethlehem Steel Corporation. As-worked, heat treated cold-workable hypoeutectoid steel. Re. 29,240, Cl. 148-36.000.

Kurelek, John, to Koehring Canada Limited. Multiple tree harvester of the flexible arm type. Re. 29,235, Cl. 144-3.00D.

Mehren, Rainer: *See*—
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Mennuto, Anthony R. Door assembly including insert storing means. Re. 29,236, Cl. 160-37.000.

Michelson, Robert A.: *See*—
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Muszumanski, Trude; and Gela, Helmut, to Vockenhuber, Karl; and Hauser, Raimund. Zoom lens for super 8 film. Re. 29,237, Cl. 350-184.000.

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Schmoll, Kurt, to Dynamit Nobel Aktiengesellschaft. Novolak molding compounds containing hexamethylenetetramine monometaborate. Re. 29,242, Cl. 260-59.00R.

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Umbach, Wilfried; Mehren, Rainer; and Stein, Werner, to Henkel & Cie G.m.b.H. Polyalkyleneglycol esthers of hydroxyalkyl mercaptans and process. Re. 29,243, Cl. 260-609.00R.

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American Optical Corporation: *See*—
Beane, Richard M., 244,528.

Asaki, James T., to International Telephone and Telegraph Corporation. Camera flash attachment. 244,527, 5-31-77, Cl. D16-42.000.

Augustin, Rolf M., Jr.; and Cutler, Norman W., Jr., to Polaroid Corporation. Photographic camera back or similar article. 244,526, 5-31-77, Cl. D16-10.000.

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Beane, Richard M., to American Optical Corporation. Pair of spectacles. 244,528, 5-31-77, Cl. D16-65.000.

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Butcher, Roger Anthony, to Aerosol Inventions and Development S.A. A.I.D.S.A. Actuator cap for a pressurized dispenser. 244,513, 5-31-77, Cl. D9-258.000.

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Dennesen, Joseph C.; and Chisholm, Colin F. Dental floss holder. 244,540, 5-31-77, Cl. D28-64.000.
Dennesen, Joseph C.; and Chisholm, Colin F. Dental floss holder. 244,541, 5-31-77, Cl. D28-64.000.
Derrington, Joseph B. Clinging game ball. 244,560, 5-31-77, Cl. D34-15.0EE.
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Doan, Troy L. Combined shower stall base and sliding door unit or the like. 244,535, 5-31-77, Cl. D23-49.000.
Dottinger, Robert J., to Litton Business Systems, Inc. Step stool. 244,494, 5-31-77, Cl. D6-32.000.
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Edwards, David L. Bicycle supporting hanger or similar article. 244,512, 5-31-77, Cl. D12-115.000.
Eidelberg, Jonah; Mooney, Thomas; and Bauer, Richard A., to ITE Imperial Corporation. Water resistant gasket for conduits and the like. 244,533, 5-31-77, Cl. D23-47.000.
Elkins, Vance V., Jr., to Pratt-Read Corporation. Golf club head. 244,558, 5-31-77, Cl. D34-5.0GH.
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Howard, John R.; and Nichols, Charles E., to Breuer Electric Mfg. Co. Vacuum cleaner-blower. 244,524, 5-31-77, Cl. D15-62.000.
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Jensen, George B., to Syracuse China Corporation. Dinner plate or similar article. 244,503, 5-31-77, Cl. D7-36.000.
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4,026,011
628 4,026,012
4,026,013
629 4,026,014
4,026,015
730 4,026,000
753 4,025,999

CLASS 30

47 4,026,016
90.6 4,026,017
233 4,026,028
254 4,026,018
386 4,026,020

CLASS 32

14 A 4,026,021
4,026,022
14 E 4,026,023
19 4,026,024
22 4,026,025
4,026,026
26 4,026,027

CLASS 33

125 M 4,026,029
174 B 4,026,030
174 L 4,026,031
265 4,026,032
338 4,026,034

CLASS 34

23 4,026,035
54 4,026,036
57 R 4,026,037

CLASS 35

10.2 4,026,038
19 A 4,026,039
4,026,040
26 4,026,041
28.3 4,026,042
77 4,026,043

CLASS 36

14 4,026,044
108 4,026,045
113 4,026,046
136 4,026,047

CLASS 37

42 R 4,026,048
67 4,026,049

CLASS 40

65 4,026,050
113 4,026,051
115 4,026,052
117 4,026,053
336 4,026,033

CLASS 42

1 A 4,026,054
1 ST 4,026,055
69 R 4,026,056
94 4,026,057

CLASS 43

15 4,026,058
17.5 4,026,059
22 4,026,060
43.13 4,026,061
44.87 4,026,062
54.5 R 4,026,063
131 4,026,064

CLASS 44

1 D 4,026,678

CLASS 46

25 4,026,065
47 4,026,066

CLASS 47

39 4,026,067
45 4,026,068

CLASS 48

73 4,026,679

CLASS 49

49 4,026,069
55 4,026,070
352 4,026,071

CLASS 51

100 R 4,026,073
168 4,026,074
313 4,026,075

CLASS 52

6 4,026,076
80 4,026,077
81 4,026,078
122 4,026,079
159 4,026,080
222 4,026,081
302 4,026,082
387 4,026,083
495 4,026,084
536 4,026,085
582 4,026,086
608 4,026,087
628 4,026,088

CLASS 53

77 4,026,089
374 4,026,090
390 4,026,091

CLASS 55

26 4,026,680
32 4,026,681
84 4,026,682
108 4,026,683
126 4,026,684
213 4,026,685
269 4,026,686
288 4,026,687
309 4,026,688

CLASS 56

14.3 4,026,092
370 4,026,093
400.04 4,026,094

CLASS 57

34.5 4,026,095
54 4,026,096
117 4,026,097
157 TS 4,026,098
160 4,026,099

CLASS 58

4 R 4,026,100
50 R 4,026,101
4,026,102
4,026,103
52 R 4,026,104

CLASS 60

226 A 4,026,105
277 4,026,106
413 4,026,107
444 4,026,108
477 4,026,113
525 4,026,114
581 4,026,109
592 4,026,110
614 4,026,115
641 4,026,111
4,026,112

CLASS 61

45 B 4,026,116
53.72 4,026,117
63 4,026,118
95 4,026,119

CLASS 62

5 4,026,120
151 4,026,121
196 C 4,026,122

CLASS 64

7 4,026,125
21 4,026,123
32 R 4,026,124

CLASS 65

1 4,026,689
2 4,026,690
27 4,026,691
30 R 4,026,692
31 4,026,693

CLASS 66

9 R 4,026,126
132 R 4,026,127
165 4,026,128
192 4,026,129
203 4,026,130

CLASS 68

17 A 4,026,131

CLASS 70

9 4,026,132
134 4,026,133
276 4,026,134

CLASS 71

11 4,026,694
28 4,026,695
4,026,696
101 Re.29,238
120 4,026,697

CLASS 72

14 4,026,135
238 4,026,136
299 4,026,137
321 4,026,138
344 4,026,140
389 4,026,139

CLASS 73

9 4,026,141
67.4 4,026,142
67.5 R 4,026,143
67.6 4,026,144
103 4,026,145
113 4,026,146
117.4 4,026,147
185 4,026,148
194 R 4,026,149
4,026,151
194 VS 4,026,150
421 R 4,026,152
421.5 R 4,026,153
423 R 4,026,154
4,026,155
432 HA 4,026,156
432 PS 4,026,157
497 4,026,158
516 LM 4,026,159

CLASS 74

5.4 4,026,160
230.17 M 4,026,161
231 C 4,026,162
425 4,026,163
478 4,026,164
480 R 4,026,165
691 4,026,166
785 4,026,167
860 4,026,168
861 4,026,169

CLASS 75

59 4,026,698
134 F 4,026,699
175 R Re.29,239

CLASS 81

3.43 4,026,170

CLASS 82

102 4,026,171

CLASS 83

106 4,026,172
421 4,026,173
438 4,026,174
442 4,026,175
502 4,026,176
835 4,026,177

CLASS 84

1.16 4,026,178
1.24 4,026,179
1.25 4,026,180
291 4,026,181
305 4,026,182
411 R 4,026,185

CLASS 85

1 JP 4,026,183
63 4,026,184
68 4,026,186
72 4,026,187

CLASS 89

1.5 R 4,026,188
1.703 4,026,189
41 B 4,026,190

CLASS 90

11 D 4,026,191

CLASS 91

25 4,026,192
216 B 4,026,193
384 4,026,194
506 4,026,195

CLASS 92

140 4,026,196
186 4,026,197

CLASS 93

1 WZ 4,026,198
36 A 4,026,199

CLASS 96

1 R 4,026,700
4,026,701
1.5 4,026,702
4,026,703
4,026,704
27 R 4,026,705
74 4,026,706
95 4,026,707
4,026,708
100 4,026,709

CLASS 98

115 VM 4,026,200

CLASS 99

355 4,026,201
4,026,202
472 4,026,203

CLASS 100

53 4,026,204
88 4,026,205
117 4,026,206
214 4,026,207

CLASS 101

116 4,026,208
231 4,026,209
350 4,026,210

CLASS 102

24 HC 4,026,211
39 4,026,212
56 SC 4,026,213
70.2 GA 4,026,214
70.2 R 4,026,215
79 4,026,216

CLASS 105

224.1 4,026,217
482 4,026,218

CLASS 106

1 4,026,710
15 FP 4,026,711
15 R 4,026,712
19 4,026,713
47 R 4,026,714
50 4,026,715
97 4,026,716
100 4,026,717
168 4,026,718
287 SB 4,026,720
287 SC 4,026,719
288 B 4,026,721
4,026,722
315 4,026,723

CLASS 108

62 4,026,219
101 4,026,220
113 4,026,221
146 4,026,222

CLASS 110

7 B 4,026,223
8 C 4,026,224

CLASS 111

2 4,026,225

CLASS 113

1 F 4,026,226

CLASS 114

61 4,026,228
102 4,026,229
104 4,026,230
145 A 4,026,231
210 4,026,232
229 4,026,233
248 4,026,234
264 4,026,227

CLASS 115

12 R 4,026,235

CLASS 116

118 R 4,026,239
124 R 4,026,236

CLASS 118

5 4,026,237
60 4,026,238
415 4,026,240
653 4,026,241
657 4,026,242

CLASS 119

5 4,026,243
51 R 4,026,244
96 4,026,245

CLASS 122

225 R 4,026,246
371 4,026,247

CLASS 123

3 4,026,248
8.47 4,026,249
32 B 4,026,250
32 EA 4,026,251
56 BC 4,026,252
73 AA 4,026,254
103 E 4,026,255
119 A 4,026,256
119 F 4,026,280
124 R 4,026,257
127 4,026,253
136 4,026,258
139 AW 4,026,259
140 R 4,026,260

CLASS 124

78 4,026,261

CLASS 125

23 T 4,026,262

CLASS 126

25 A 4,026,266
25 B 4,026,265
121 4,026,263
123 4,026,264
270 4,026,267
4,026,268
4,026,269
271 4,026,270
4,026,271
4,026,272
4,026,273
390 4,026,274

CLASS 128

2 N 4,026,275
2 P 4,026,276
2.05 A 4,026,277
2.06 E 4,026,278
44 4,026,279
130 4,026,281
134 4,026,282
142.3 4,026,283
188 4,026,284
192 4,026,285
204 4,026,286
215 4,026,287
218 F 4,026,288
223 4,026,289
260 4,026,290
284 4,026,291
285 4,026,292
303.1 4,026,293
305 4,026,294
4,026,295
349 B 4,026,296
349 R 4,026,298
359 4,026,297
400 4,026,299
418 4,026,300

4,026,301
4,026,302
4,026,303
419 F 4,026,304
419 PT 4,026,305

CLASS 131

10.5 4,026,306
225 4,026,019

CLASS 132

11 R 4,026,307
91 4,026,308

CLASS 133

8 R 4,026,309

CLASS 134

14 4,026,724
48 4,026,311
86 4,026,310

CLASS 135

3 R 4,026,312
4 R 4,026,313

CLASS 136

202 4,026,726

CLASS 137

116.5 4,026,314
171 4,026,315
212 4,026,316
216.1 4,026,317
223 4,026,318
255 4,026,319
343 4,026,320
487 4,026,321
512 4,026,322
562 4,026,323
605 4,026,324
625.26 4,026,325
625.66 4,026,326
630 4,026,327
801 4,026,328

CLASS 138

97 4,026,329
103 4,026,330

CLASS 139

383 A 4,026,331

CLASS 140

93 B 4,026,332
105 4,026,333
112 4,026,334

CLASS 141

100 4,026,335
348 4,026,336

CLASS 144

3 D Re.29,235
193 R 4,026,337

CLASS 145

50 A 4,026,338

CLASS 148

1.5 4,026,733
2 4,026,727
6.14 R 4,026,728
4,026,737
6.15 R 4,026,734
12.4 4,026,729
31.5 4,026,730
36 Re.29,240
134 4,026,731
154 4,026,732
171 4,026,735
187 4,026,736

CLASS 149

44 4,026,738
88 4,026,739

CLASS 150

28 R 4,026,339
48 4,026,340

CLASS 151

41.74 4,026,341

CLASS 152

18 4,026,342

CLASS 156

110 A 4,026,744
155 4,026,745
4,026,746
171 4,026,747
187 4,026,748
252 4,026,749
273 4,026,750
306 4,026,751
457 4,026,752
502 4,026,753
521 4,026,754
538 4,026,755
540 4,026,758
554 4,026,756
575 4,026,757
628 4,026,740
4,026,741
632 4,026,759
643 4,026,742
653 4,026,743

CLASS 159

48 L 4,026,760
49 4,026,761

CLASS 160

37 Re.29,236
189 4,026,343

CLASS 162

181 A 4,026,762

CLASS 164

26 4,026,344
147 4,026,346
202 4,026,345

CLASS 165

2 4,026,347
32 4,026,348
41 4,026,349
46 4,026,350
58 4,026,351
95 4,026,352
135 4,026,353

CLASS 166

95 4,026,354
246 4,026,355
259 4,026,356
261 4,026,357
4,026,358
263 4,026,359
272 4,026,360
281 4,026,361
314 4,026,362
315 4,026,363

CLASS 172

68 4,026,364
386 4,026,365
511 4,026,366
730 4,026,367
809 4,026,368

CLASS 173

12 4,026,369

CLASS 174

48 4,027,094
52 R 4,027,096
66 4,027,097

CLASS 175

20 4,026,370
45 4,026,371
410 4,026,372

CLASS 176

87 4,026,763

CLASS 178

3 4,027,098
23 R 4,027,099
69.1 4,027,100

CLASS 179

1 GQ 4,027,101
1 VC 4,027,102
5 R 4,027,103
7 R 4,027,104
15 AT 4,027,106
15 BC 4,027,105
15 BT 4,027,107
18 BE 4,027,109
18 EB 4,027,108
99 4,027,110
115 V 4,027,111
146 H 4,027,112
156 R 4,027,113
170 G 4,027,118
170.2 4,027,114
179 4,027,115
180 4,027,116
4,027,117

CLASS 180

9.22 4,026,373
33 C 4,026,374
4,026,375
54 A 4,026,376
64 R 4,026,377
68.5 4,026,378
77 S 4,026,379
89.12 4,026,380

CLASS 181

36 A 4,026,072
62 4,026,381
117 4,026,382
121 4,026,383
167 4,026,384

CLASS 182

75 4,026,385

CLASS 184

7 R 4,026,386

CLASS 187

9 R 4,026,387
14 4,026,388
29 R 4,026,389

CLASS 188

24 4,026,390
71.9 4,026,391
166 4,026,392
218 XL 4,026,393
331 4,026,394

CLASS 190

16 4,026,395

CLASS 192

4 A 4,026,396
48.1 4,026,397
98 4,026,398
4,026,399
99 A 4,026,400

CLASS 195

31 F 4,026,764
81 4,026,765
96 4,026,766
103.5 M 4,026,767

CLASS 197

1 R 4,026,401
4,026,402
53 4,026,403
73 4,026,404
133 R 4,026,405

CLASS 198

420 4,026,406
735 4,026,407
741 4,026,408
774 4,026,409
848 4,026,410

CLASS 200

6 A 4,027,119
31 A 4,027,120
61.13 4,027,121
77 4,027,122
144 B 4,027,123
146 R 4,027,124
148 B 4,027,126
148 R 4,027,125
153 LA 4,027,127
158 4,027,128
159 A 4,027,129
161 4,027,130
246 4,027,131

CLASS 202

241 4,026,768
248 4,026,769

CLASS 203

29 4,026,770

CLASS 204

1 T 4,026,774
105 R 4,026,771
106 4,026,772
108 4,026,773
117 4,026,776
129.75 4,026,779
141.5 4,026,777
159 4,026,778
181 4,026,775
4,026,780
228 4,026,781
254 4,026,782
266 4,026,783
273 4,026,784
286 4,026,785
290 F 4,026,786
298 4,026,787

CLASS 206

45.19 4,026,411
331 4,026,412
343 4,026,413

CLASS 208

39 4,026,788
74 4,026,789

CLASS 209

111.7 R 4,026,414

CLASS 210

12 4,026,793
21 4,026,790
4,026,791
27 4,026,792
30 A 4,026,795
36 4,026,796
43 4,026,794
50 4,026,797
54 Re.29,241
63 R 4,026,798
84 4,026,799
87 4,026,800
140 4,026,801
151 4,026,802
167 4,026,804
198 C 4,026,803
223 4,026,805
405 4,026,806

CLASS 211

4 4,026,415
26 4,026,416
163 4,026,417

CLASS 213

8 4,026,418

CLASS 214

1 BT 4,026,420
1 H 4,026,419
6 DK 4,026,421
6 P 4,026,422
10 4,026,423
11 R 4,026,424
16 B 4,026,425
17 DB 4,026,426
36 4,026,427
138 R 4,026,428
152 4,026,429
313 4,026,430
519 4,026,431
672 4,026,432

CLASS 215

6 4,026,433

CLASS 219

10.55 F 4,027,132
4,027,133
69 E 4,027,134
76 4,027,135
98 4,027,136
121 L 4,027,137
216 4,027,138
525 4,027,139

CLASS 220

18 4,026,434
85 H 4,026,435

CLASS 221

15 4,026,436
211 4,026,437
231 4,026,438

CLASS 222

49 4,026,439
146 R 4,026,440
181 4,026,442
600 4,026,443
609 4,026,441

CLASS 223

37 4,026,444
69 4,026,445
88 4,026,446
98 4,026,447

CLASS 224

32 A 4,026,448
45 L 4,026,449
45 R 4,026,501

CLASS 226

42 4,026,450
91 4,026,451
119 4,026,452

CLASS 227

109 4,026,453
151 4,026,454

CLASS 228

118 4,026,455
136 4,026,456

CLASS 229

2.5 R 4,026,457
30 4,026,458
43 4,026,459
62.5 4,026,460

CLASS 232

17 4,026,461

CLASS 233

29 4,026,462

CLASS 235

7 R 4,027,140
61.7 R 4,027,141
61.9 R 4,027,142
88 R 4,026,463
92 PE 4,027,143
144 ME 4,027,144
151.1 4,027,246
151.11 4,027,245
151.21 4,027,145
151.31 4,027,146
164 4,027,147
198 4,027,148

CLASS 236

48 R 4,026,464
4,026,465

CLASS 238

349 4,026,466

CLASS 239

63 4,026,467
66 4,026,468
78 4,026,469
102 4,026,470
127.3 4,026,472
206 4,026,471
229 4,026,473
430 4,026,474
468 4,026,475
680 4,026,476

CLASS 240

7.1 LJ 4,027,149
7.55 4,027,150
41.35 R 4,027,151

CLASS 241

14 4,025,990
17 4,026,477
24 4,026,478
30 4,026,479
4,026,480
169.1 4,026,490
266 4,026,481

CLASS 242

18.1 4,026,482
25 R 4,026,483
45 4,026,484
55 4,026,485
58.6 4,026,486
65 4,026,487
72 B 4,026,488
4,026,491
74.2 4,026,489
75.2 4,026,492
84.1 R 4,026,493
107 4,026,494
129.62 4,026,495
191 4,026,496
206 4,026,497

CLASS 244

3.23 4,026,498
31 4,026,499
36 4,026,500
108 4,026,502
135 B 4,026,503
155 A 4,026,504

CLASS 246

34 R 4,026,505
4,026,506

CLASS 248

54 R 4,026,507
220.3 4,026,508
406 4,026,509
493 4,026,510

CLASS 249

62 4,026,511
141 4,026,512

CLASS 250

199 4,027,152
4,027,153
214 AG 4,027,154
222 PC 4,027,155
275 4,027,156
303 4,027,157
315 R 4,027,158
338 4,027,159
339 4,027,160
4,027,161
345 4,027,162
363 R 4,027,163
372 4,027,164
381 4,027,165
416 R 4,027,166
513 4,027,167
514 4,027,168
536 4,027,169

CLASS 251

61.1 4,026,513
152 4,026,514
172 4,026,515
214 4,026,516
4,026,517
330 4,026,518

CLASS 252

8.1 4,026,808
4,026,810
51.5 A 4,026,809
63.2 4,026,811
75 4,026,812
89 R 4,026,813
132 4,026,814
180 4,026,815
301.6 R 4,026,816
312 4,026,817
313 R 4,026,819
316 4,026,818
419 4,026,821
429 B 4,026,822
432 4,026,820
470 4,026,920
472 4,026,823
522 4,026,824
547 4,026,825

CLASS 254

2 R 4,026,519
28 4,026,520
4,026,521
30 4,026,522
93 R 4,026,523
4,026,524
150 R 4,026,525
168 4,026,526

CLASS 259

4 R 4,026,527
7 4,026,528
4,026,529
9 4,026,530
72 4,026,531
104 4,026,532

CLASS 260

2 P 4,026,830
2 S 4,026,826
4,026,827
2.1 R 4,026,831
2.3 4,026,832
2.5 AB 4,026,837
2.5 AC 4,026,836
4,026,840
2.5 AK 4,026,931
2.5 AP 4,026,829
2.5 FP 4,026,838
4,026,839
2.5 HA 4,026,841
2.5 N 4,026,828
4,026,834
2.5 S 4,026,835
4,026,842
4,026,843
4,026,844
4,026,845
4,026,846
17.2 4,026,847
4,026,848
17.4 GC 4,026,849
22 TN 4,026,850
23 AR 4,026,851
23 XA 4,026,852
25 R 4,026,833
28.5 AS 4,026,853
4,026,854
29.4 R 4,026,856
4,026,857
29.4 UA 4,026,855
29.6 H 4,026,932
30.2 4,026,858
30.4 R 4,026,859
30.6 R 4,026,860
30.8 R 4,026,861
33.6 AQ 4,026,933
37 EP 4,026,862
38 4,026,864
42.14 4,026,863
42.32 4,026,865
45.75 N 4,026,866
46 4,026,867
46.5 R 4,026,868
47 CZ 4,026,869
47 ET 4,026,870
49 4,026,871
59 R Re.29,242
4,026,872
67 FP 4,026,873
77.5 A 4,026,875
77.5 MA 4,026,874
78 TF 4,026,876
79.5 P 4,026,877
4,026,878
121 4,026,879
239 E 4,026,880
239.1 4,026,881
239.55 D 4,026,882
240 D 4,026,883
240 G 4,026,885
240 R 4,026,884

243 C 4,026,886
4,026,887
4,026,888
246 B 4,026,935
349.6 4,026,890
349.9 4,026,889
250 AH 4,026,891
251 R 4,026,892
256.4 F 4,026,893
256.4 Q 4,026,894
268 TR 4,026,895
288 CF 4,026,898
288 R 4,026,897
293.57 4,026,899
293.69 4,026,937
294.8 C 4,026,936
295 E 4,026,938
296 M 4,026,900
307 H 4,026,902
307 R 4,026,901
309 4,026,903
326 C 4,026,904
327 M 4,026,905
327 P 4,026,906
345.5 4,026,907
348.5 L 4,026,908
404.5 4,026,939
408 4,026,909
410.9 R 4,026,910
413 4,026,911
439 CY 4,026,912
456 P 4,026,940
463 4,026,913
465 D 4,026,914
468 D 4,026,919
471 A 4,026,915
471 R 4,026,916
473 G 4,026,917
475 P 4,026,941
488 B 4,026,918
4,026,921
4,026,922
4,026,923
497 R 4,026,924
501.1 4,026,925
513 T 4,026,926
514 D 4,026,927
515 A 4,026,928
535 R 4,026,929
539 A 4,026,930
553 R 4,026,942
563 B 4,026,943
567.6 P 4,026,945
580 4,026,944
584 C 4,026,807
4,026,946
586 P 4,026,947
4,026,948
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	271	244,492		53	244,505		114	244,519	D19—	49	244,529		55	244,554			244,541
	400	244,493		179	244,506		115	244,512	D23—	4	244,530		73	244,564	D30—	7	244,553
D6—	32	244,494		183	244,507		130	244,520		18	244,531	D25—	15	244,542	D34—	5 GH	244,557
	78	244,495	D8—	351	244,510			244,521		35	244,532		85	244,543			244,558
	114	244,496		354	244,508		182	244,522		47	244,533			244,544		5 H	244,556
		244,497	D9—	164	244,509	D14—	12	244,551		49	244,535			244,545		5 MM	244,559
		244,498		242	244,511		37	244,550		58	244,536			244,546		15 EE	244,560
	186	244,499		258	244,513	D15—	62	244,523		63	244,534			244,547	D48—	20 E	244,561
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	14	244,502	D11—	81	244,516		10	244,526		163	244,539	D27—	42	244,552	D87—	1 R	244,565
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4,026,521	4,026,218	4,026,735	4,027,162	4,026,525	4,026,746
4,026,586	4,026,222	4,026,740	4,027,201	4,026,561	4,026,764
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4,027,168	4,026,245	4,026,756	4,026,040	4,026,734	4,026,804
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	244,536		244,551		244,516		244,544	39	244,496	48	244,508
	244,559		244,554		244,542		244,545		244,497		244,532
	244,560	18	244,493								
9	244,506	25	244,523	31	244,550		244,546		244,498		244,553
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PLANT PATENTS

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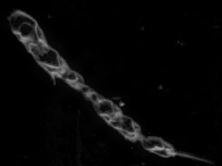
Juanita M. Kreps, Secretary

PATENT AND TRADEMARK OFFICE
C. Marshall Dann, Commissioner